

# INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES

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May 1976



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concerning the above named person. This information should be  
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CANADA AND UNITED STATES







### IFYGL BULLETIN ARTICLES

It is requested that scientists who are or have been conducting studies using IFYGL data submit summary articles for inclusion in the IFYGL Bulletin. The purpose of the Bulletin is to provide documentation of the IFYGL program in all its aspects and to facilitate distribution of information to all interested parties. Results of analysis of IFYGL data being made available will increase the value of the IFYGL data archives and be of help to scientists undertaking further studies based on these and other Lake Ontario data.

IFYGL BIBLIOGRAPHY

A joint Canadian-United States list of publications related to IFYGL was included in IFYGL Bulletin No. 13, and will appear, cumulatively, in all subsequent issues. Additions will be identified as such in each Bulletin. Any questions, comments, or additions to the bibliography should be addressed to one of the IFYGL Coordinators as follows:

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Official IFYGL Publications

IFYGL Bulletin Nos. 1-17 (January 1972 to February 1976)<sup>1,2</sup>

IFYGL Technical Plan, Volumes 1-4 (series complete, 1971)<sup>1</sup>

IFYGL Canadian Projects, March 1972 (series complete, 1973)

Canadian Projects Supplement No. 1 - July	1972
" " " No. 2 - October	1972
" " " No. 3 - February	1973
" " " No. 4 - June	1973

IFYGL Technical Manual series

- No. 1 "Methods of Measuring Soil Moisture" by R. G. Wilson, 1972<sup>2</sup>.
- No. 2 "Radiation Measurement" by J. Ronald Latimer, 1972<sup>1,2</sup>.
- No. 3 "Measurement of Currents in the Great Lakes" by M. D. Palmer 1973.<sup>2</sup>
- No. 4 "U.S. IFYGL Precipitation Data Acquisition System" by A. L. Hansen, J. W. Wilson, C. F. Jenkins, and L. A. Weaver, 1973<sup>1,2</sup>.
- No. 5 "U.S. IFYGL Shipboard Data Acquisition System" by A. Robertson, 1974<sup>1,2</sup>.
- No. 6 "IFYGL Rawinsonde Data Acquisition System" by C. J. Callahan, J. A. W. McCulloch, E. J. Aubert, and E. M. Rasmussen, 1976<sup>1,2</sup>.
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Two Nations, One Lake - Science in Support of Great Lakes Management<sup>1,2</sup>

Objectives and Activities of the International Field Year for the Great Lakes 1965-1973. Prepared by John O. Ludwigson for the Canadian and U.S. National Committees for the International Hydrological Decade, May 1974, 145 pp.

Proceedings, IFYGL Symposium, Fifty-Fifth Annual Meeting of the American Geophysical Union, Washington, D.C., April 8-12, 1974, August 1974, 169 pp.<sup>1,2</sup>

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Available in the U.S. from the  
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- Clark, P. A. A., and F. Sciremammo, "On Nutrient Transport From the Genesee," Regional Field Office, EPA, Rochester, New York.
- Csanady, G. T., "Time-Average Circulation in Shallow Seas," Woods Hole Oceanographic Institution, Woods Hole, Massachusetts.
- Czaika, S. C., "Crustacean Zooplankton of Southwestern Lake Ontario in Spring 1973 and at the Genesee and Niagara River Mouth Areas in 1972 and Spring 1973," Great Lakes Laboratory, State University College at Buffalo, New York.
- Dilley, J. F., and A. Pavlak, "Lake Shore Ice Formation, Growth, and Decay," General Electric Company, Philadelphia, Pennsylvania.
- Donelan, M. A., "The Influence of Wind-Generated Waves on the Wind Profile," Canada Centre for Inland Waters, Burlington, Ontario.
- Donelan, M. A., and F. C. Elder, "Evaluation of the Measurement Accuracy of the CCIW IFYGL Meteorological Buoy," Canada Centre for Inland Waters, Burlington, Ontario.
- Hovanec, R. D., and J. A. Almazan, "A Comparison of the U.S. and Canadian Meteorological Buoy Data During IFYGL," Center for Experiment Design and Data Analysis, Environmental Data Service, National Oceanic and Atmospheric Administration, Washington, D.C.
- Landsberg, D. R., and J. T. Scott, "On the Cyclonic Mean Circulation in Lake Ontario," State University of New York at Albany, New York.
- Letki, P. J., "Carbonate and Organic Carbon in the Sediments of the Southwestern Nearshore Zone of Lake Ontario (IFYGL)," State University College at Buffalo, New York.
- Liu, P. C., and T. A. Kessenich, "IFYGL Ship Wave Observations vs. Wave Measurements," Great Lakes Environmental Research Laboratory, National Oceanic and Atmospheric Administration, Ann Arbor, Michigan.
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Polcyn, F. C., and T. W. Wagner, "Production of Hydrological Computer Maps of the Lake Ontario Basin," Environmental Research Institute of Michigan, Ann Arbor, Michigan.

Sullivan, J.<sup>1</sup>, E. M. Rasmusson<sup>1</sup> and H. L. Ferguson<sup>2</sup>, "Atmospheric Water Balance Over Lake Ontario," <sup>1</sup>Center for Experimental Design and Data Analysis, Environmental Data Service, National Oceanographic and Atmospheric Administration, Washington, D.C.; <sup>2</sup>Canada Centre for Inland Waters, Burlington, Canada.

Thomann, R. V., and R. P. Winfield, "Estimated Response of Lake Ontario Phytoplankton Biomass to Nutrient Reduction," Manhattan College, Bronx, New York.

Thomas, N. A., "Lake Ontario Sediment Oxygen Demand Rates," EPA, Grosse Ile, Michigan.

Watson, N. H. F., and D. J. Williams, "Design and Operation of a Pilot Surveillance Program for Lake Ontario," Canada Centre for Inland Waters, Burlington, Ontario.





CANADA

Editor

R.J. Mills

Typing

(Miss) L.S. Tozer



## Data Management Report

The final Canadian IFYGL Data and Information Catalogue was completed in mid-March and submitted to the printers. It is hoped that the catalogue will be available for distribution sometime in April.

The format of the catalogue was established to provide answers to the questions, what data were collected and where and when the data were collected. Also the particular format was selected to provide information in sufficient detail to interested researchers. The catalogue is divided by panels with sub-divisions by projects giving information on the objectives of that panel or project and where in the catalogue the data, associated with a particular project, are found.

It is hoped that researchers from around the world will make use of the catalogue and the data stored in the archives.



CANADIAN PROJECT REPORTS

Notes:

1. Projects are numbered consecutively.
2. The letters following the number indicate which panel has prime responsibility for the project.

BC - Biology-Chemistry  
 BL - Boundary Layer  
 EB - Energy Budget  
 ME - Lake Meteorology and Evaporation  
 TW - Terrestrial Water Balance  
 WM - Water Movement  
 F - Feasibility

Project1F: *Remote Sensing*Principal Investigator: K.P.B. Thompson - CCIW

The project is complete. Three scientific papers have resulted from this project, and are listed in the IFYGL Bibliography. Two were authored by the Principal Investigator and a third is listed under R.P. Bukata.

3WM: *Statistical Predication of Lake Currents*Principal Investigator: H.S. Weiler - CCIW

This project has been cancelled and there will be no material submitted to the IFYGL Data Bank.

4WM: Included in Project 45WM: *Lake Current Measurements*5BL: *Direct Measurement of Energy Fluxes*Principal Investigator: M. Donelan - CCIW

A number of papers have resulted from this project to date, and are listed in the Bibliography under the Principal Investigator. An interim report including all valid profile data from this project is now available from the Canadian IFYGL Data Bank.

8EB: *Shore Gauging Stations of Water Temperature*

Principal Investigator: D.G. Robertson - CCIW

A report on the results of the observations will be incorporated with the final report on Project 42EB by F.M. Boyce.

9EB: Included in Project 42EB.

11TW: *Monthly Water Balance of the Lake Ontario Basin*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

The calculations for this project are complete. A first draft of the Final Report to be included in the Terrestrial Water Balance Panel Report is in preparation. A number of scientific papers resulting from this IFYGL project are listed in the Bibliography under the Principal Investigator.

12TW: *Monthly Water Balance of Lake Ontario*

Principal Investigator: D.F. Witherspoon - IWD, Cornwall

This project is essentially complete. A first draft of the Final Report to be included in the Terrestrial Water Balance Panel Report is in preparation. Final results await radar precipitation final values for the lake. The following papers have resulted from this project:

Witherspoon, D.F. "General Water Balance of Lake Ontario and Its Local Land Basin", International Geographical Congress, Montreal, August, 1972.

DeCooke, B.G. and D.F. Witherspoon. "Preliminary Lake Ontario Water Balance During IFYGL", Proceedings, 16th Conference, Great Lakes Research (IAGLR), Sawmill Creek, Ohio, April 1973.

DeCooke, B.G. and D.F. Witherspoon. "An Estimate of the Water Balance of Lake Ontario During IFYGL", Proceedings, IFYGL Symposium, 55th Annual Meeting, American Geophysical Union, April 8-12, 1974.

13TW: *Groundwater Flow into Lake Ontario*

Principal Investigator: D.H. Lennox - IWD

This project is complete. Two publications have resulted under the authorship of C.J. Haefeli and are listed in the IFYGL Bibliography.

14TW: *Hydrology of Lake Ontario*

Principal Investigator: E.A. MacDonald - IWD

This project is now complete and the data have been submitted to the IFYGL Data Bank.

15BL: *Space Spectra in the Free Atmosphere*

Principal Investigators: G.A. McBean and E.G. Morrissey - AES

Work is continuing on this project. A recent scientific paper "Scaling Turbulences in the Planetary Boundary Layer", by G.A. McBean has been submitted for review and subsequent publication in "Atmosphere".

16ME: *Airborne Radiation Thermometer Survey*

Principal Investigator: J.G. Irbe - AES

This project is complete. One paper resulting from this project will be published shortly "Aerial Surveys of Lake Ontario Water Temperature and Description of Regional Weather Conditions During IFYGL (Jan. '72 - Mar. '73)" by J.G. Irbe and R.J. Mills.

18ME: *Climatological Network*

Principal Investigator: J.A.W. McCulloch - AES

This project is complete.

19ME: Included in Project 66ME.



20ME: *Bedford Tower Program*

Principal Investigator: J.A.W. McCulloch and D.W. Phillips - AES

Programs to convert raw paper tape data to scientific units are complete. Actual production runs are 95% complete and it is that 90-95% of the Bedford Tower Data will be on disk by mid April 1976. It is difficult to estimate exactly when the final version of the data will be submitted to the Data Bank.

21ME: *Canadian Shoreline Network*

Principal Investigator: J.A.W. McCulloch - AES

Four tapes comprising 98% of the recoverable data were submitted to the Data Bank in November. It is difficult to estimate exactly when the final version of the data will be submitted to the Data Bank.

22ME: *Synoptic Studies*

Principal Investigators: M.E. Lalande and D.W. Phillips - AES

Three meteorological situations have been selected for detailed synoptic analysis. All available wind, temperature, humidity, and pressure data, are being gathered. One important objective will be to test a synoptician's analysis of the meteorological event using only standard network observations and then supplemented with IFYGL data.

23ME: *Radar Precipitation*

Principal Investigator: D.M. Pollock - AES

Equipment failure in the photo-scanner has halted the progress in the digitizing of radar data on film. Of the nine months of data already digitized, two months have been processed for conversion to rain rate and calculation of daily accumulation. The final draft of the Scientific Report on the Precipitation Radar Project has been prepared and is being submitted for review.

24ME: *Climatological Studies*Principal Investigator: D.W. Phillips - AES

This project is complete. Publications resulting from this project are listed in the Bibliography under the authorship of the principal investigator.

25ME: *Lake Ontario Evaporation by Mass Transfer*Principal Investigator: J.G. Irbe and D.W. Phillips - AES

Monthly and daily evaporation estimates have been prepared by the mass transfer method, and have been submitted to the Evaporation Synthesis Group.

A modified mass transfer technique has been prepared, in which regression equations requiring fetch, and surface water temperature over that fetch, as well as the thermodynamic variables, are used to estimate the heat flux at 88 grid points over the lake.

26ME: *Over-Water Climatological Ratios*Principal Investigator: D.W. Phillips and M.E. Lalande - AES

Project 26ME, "Wind and Humidity Ratios", has been renamed Over-Water Climatological Ratios. With tower, ship and buoy data now available, techniques for deriving over-land/over-water climatological ratios for temperature, humidity, wind speed and direction, pressure and precipitation have been developed. Sorting simultaneous data by stability, fetch and other criteria will be attempted to derive average ratios and measures of their variability. Work has begun on developing a program to pair over-lake and over-land simultaneous observations.

27ME: *Island Precipitation Network*Principal Investigator: J.A.W. McCulloch - AES

This project is complete. The data have been published in Supplementary Precipitation, Vol. 4, No's. 2 and 3.

28BL: *Momentum, Heat, and Moisture Transfer*

Principal Investigators: G.A. McBean, H.C. Martin,  
R.J. Polavarapu - AES

Data analysis is complete and a comprehensive data report has been submitted to the IFYGL Data Bank. The Data Report was presented in Bulletin No. 13. A recent paper on this subject was published in "Atmosphere", Vol. 13, Number 2, 1975, entitled "Turbulent Fluxes Over Lake Ontario During a Cold Frontal Passage" by G.A. McBean.

29BL: *Space and Time Spectra*

Principal Investigators: F.B. Muller and C.D. Holtz - AES

Data for the synoptic network have been provided to the IFYGL Data Bank. Additional data from the meso-scale network are held by the Principal Investigators.

30F: *CCGS Porte Dauphine - IFYGL Operations*

Principal Investigator: G.K. Rodgers - CCIW

Completed.

32EB: *Thermal Bar Study*

Principal Investigator: G.K. Rodgers - CCIW

The results of the study regarding the heat content change of Lake Ontario are now available and further work on this project is now planned.

34WM: *Circulation Near Toronto*

Principal Investigator: G.K. Rodgers - CCIW

The final report is in preparation.

36EB: *Electronic Bathythermograph*

Principal Investigator: G.K. Rodgers - CCIW

This project is complete.



38TW: *Groundwater*

Principal Investigator: R.C. Ostry - OME

Several papers resulting from this project are listed in the IFYGL Bibliography under the Principal Investigator and S.N. Singer.

40WM: *Coastal Chain Study*

Principal Investigator: G.T. Csanady - University of Waterloo

Completed.

42EB: *Heat Storage of Lake Ontario*

Principal Investigator: F.M. Boyce - CCIW

This project is complete and the final report is in the review stage.

43EB: *Internal Wave Measurements*

Principal Investigator: F.M. Boyce - CCIW

This project is complete and the final report is in the review stage.

44BL: *Analysis of Energy Fluxes*

Principal Investigator: F.C. Elder - CCIW

This project is essentially complete. Preliminary estimates of the energy fluxes have been computed on a weekly basis and entered into the data archives. A paper prepared in cooperation with J.A. Davies and F.M. Boyce was published in Part II of the Proceedings of the 17th Conference on Great Lakes Research. The paper is entitled "Preliminary Energy Budget of Lake Ontario for the Period May Through November, 1972."

45WM: *Lake Current Measurements*

Principal Investigator: E.B. Bennett - CCIW

There is no further progress to report beyond that outlined in the paper "IFYGL Water Movement Program" co-authored by E.B. Bennett and J.H. Saylor. This paper was published in Proceedings, IFYGL Symposium, 55th Annual Meeting of the American Geophysical Union, Washington, D.C., April, 1974.

46TW: *St. Lawrence-Niagara River Measuring Program*

Principal Investigator: M.H. Quast - IWD

This project is complete. The data report has been submitted.

47TW: *Computer Modelling*

Principal Investigator: L.E. Jones - University of Toronto

No report available.

49TW: *Snow Stratigraphy and Distribution*

Principal Investigator: W.P. Adams - Trent University

The paper, "Areal Differentiation of Snowcover in East Central Ontario" by W.P. Adams has resulted from this project. The abstract is as follows: Patterns of variation of snow depth, density, and water equivalent are identified using snow course, snow grid and random sample measurements. The limitations of generalizations about snowcover types in areas where mid-winter melt is a feature of snowcover evolution are discussed.

54BC: *Groundwater Supply Near Kingston*

Principal Investigator: W.A. Gorman - Queen's University

This project is complete. One paper, "Geochemistry of Deadman Bay Near Kingston, Ont.", prepared by L.M. Johnston as a M.Sc. Thesis, has resulted from this project.

55EB: Included in 32EB.

62ME: *Evaporation Synthesis*

Principal Investigator: H.L. Ferguson - AES

Little progress is expected in the activities of the Evaporation Synthesis Group until final reports from some of the evaporation studies have been received. A meeting of the Panel on 12 April '76 in Ann Arbor will review daily and weekly evaporation estimates and discuss synthesis methods.

63ME: *Airborne Water Balance Study*

Principal Investigator: T.B. Kilpatrick - AES

This project is complete. A detailed report of the project's activities was included in Bulletin No. 9.

64ME: *Atmospheric Water Balance Study*

Principal Investigator: H.L. Ferguson - AES

A comprehensive report on this project was included in Bulletin No. 12. Three papers resulting from this project are listed in Bulletin No. 16. Continuing work on this project includes an analysis of the water vapour storage and flux divergence based on surface and tower data compared to estimates based on the rawinsonde network.

65ME: *Special Shoreline Evaporation Pan Network*

Principal Investigator: D.W. Phillips - AES

All data abstraction difficulties have been cleared up. It is expected that with a minimal amount of clerical assistance, estimates of pan evaporation will be placed in the Data Bank archive early in 1976.



66ME: *Basin Evapotranspiration*

Principal Investigator: H.L. Ferguson - AES

This project is now complete. A status report was presented in Bulletin No. 12, the abstract of a paper "Monthly Evapotranspiration Estimates for the Canadian Land Portion of the Lake Ontario Basin During IFYGL" by H.L. Ferguson and W.D. Hogg. This paper has been published in the Proceedings, 17th Conference for Great Lakes Research.

67ME: *Surface Water Temperature Distribution*

Principal Investigator: M.S. Webb - AES

This project is complete and the final report was published in the Proceedings, 17th Conference on Great Lakes Research (IAGLR) and was entitled, "Mean Monthly Temperatures of Lake Ontario During the IFYGL" by M.S. Webb.

68F: *CCIW Supporting Resources*

Principal Investigator: P.G. Sly - CCIW

Continues.

69TW: *Pleistocene Mapping*

Principal Investigator: E.P. Henderson - GSC

No report available.

70WM: *Ground Truth for Remote Sensing*

Principal Investigator: A. Falconer - Univ. of Guelph

A paper in unpublished manuscript form, has resulted from this project and is listed in the Bibliography under the authorship of the principal investigator.

71EB: *Canadian Radiation Network*

Principal Investigator: J.A.W. McCulloch - AES

See project 80EB.

72EB: *Floating Ice Research*

Principal Investigator: R.O. Ramseier - DOE, Ice

Two papers resulting from this project are listed in the Bibliography under the authorship of R.O. Ramseier and D. Dickins.

73EB: *Terrestrial Heat Flow*

Principal Investigator: A. Judge - EM&R

Last reported in Bulletin No. 10. Two papers resulting from this project are listed in the Bibliography under the authorship of the principal investigator.

74TW: *Water Level Network*

Principal Investigator: G.C. Dohler

This project has been terminated. A paper resulting from this project, "Helmholtz Resonance in Harbours of the Great Lakes" by N.G. Freeman, P.F. Hamblin and T.S. Murty was published in the Proceedings, 17th Conference on Great Lakes Research (IAGLR), August, 1974.

75BL: *Wind and Temperature Fluctuations*

Principal Investigators: S.D. Smith and E.C. Banke - Bedford Institute

This project was completed with the publication of: "Eddy Flux Measurements Over Lake Ontario" by S.D. Smith, Boundary Layer Meteorology, Vol. 6, pp. 235-255. Some additional comparison work may be undertaken when Niagara Bar data from Donelan (CCIW) and McBean (AES) are available.

76WM: *Surface Wave Studies*

Principal Investigator: G.L. Holland - MSD

This project is complete and all data are archived at the Canadian IFYGL Data Bank.

78TW: *Basin Water Balance*

Principal Investigator: M. Sanderson - University of Windsor

This project has been cancelled.

79F: *Bathymetric Surveys of Lake Ontario*

Principal Investigator: T.D.W. McCulloch - CCIW

This project is complete.

80EB: *IFYGL Radiation Balance Program*

Principal Investigator: J.A. Davies - McMaster University

This project was completed with the publication of "Canadian Radiation Measurements and Surface Radiation Balance Estimates for Lake Ontario During IFYGL" by J.A. Davies and W.M. Schertzer. All data measurements have been submitted to the Data Bank.

81BC: *Materials Balance - Lake Ontario*

Principal Investigator: S. Salbach - OME

A comprehensive report was included in Bulletin No. 12.

82BC: *Lake Ontario Zooplankton Migration*

Principal Investigator: J.C. Roff - University of Guelph

One paper, "Energetics of Vertical Migration in Mysis Loven 1862" by J.B. Foulds, has resulted from this project.

83BC: *Cooperative Studies of Fish Stocks*

Principal Investigator: W.J. Christie - OMNR

Work is progressing on this project. Computer programs have been written and the analysis of the fish stomach data is underway giving a coefficient of community and on index of similarity. A paper on the results is planned for later in the fall.



84BC: *Cladophora Growth*

Principal Investigator: G.E. Owen - OME

Results of Biomass Study and Ground Truth information will be presented in the final report on this project to be completed by early 1976.

85BC: *Nutrient Cycles - Lake Ontario*

Principal Investigator: A.S. Fraser - CCIW

A presentation using the information from this project will be presented at the 19th Conference on Great Lakes Research to be held in Guelph, Ontario, May 4-6, 1976.

87EB: Included in Project 42EB.

89WM: *Turbulent Diffusion Studies*

Principal Investigator: C.R. Murthy - CCIW

No further progress to report. Several papers resulting from this project are listed in the Bibliography under the authorship of the principal investigator.

90WM: Included in Project 89WM.

94: *Data Retransmission by Satellite*

Principal Investigator: H. MacPhail - CCIW

The final report on this project is completed, and is entitled, "Data Retransmission via satellite, Field Year 1972" authored by the Principal Investigator.

95WM: *Hydrodynamic Modelling*

Principal Investigator: T.J. Simons - CCIW

For a complete report see Bulletin No. 12. There were five scientific papers published from this project and they are listed in the Bibliography under the name of the Principal Investigator. This project is now complete.

96WM: Included in Project 45WM.

97BL: *Meteorological Buoy Measurements*

Principal Investigator: F.C. Elder - CCIW

This project is complete and all data have been submitted to the Data Bank. One paper entitled, "The Evaluation of the Measurement Accuracy of the CCIW IFYGL Meteorological Buoy" authored by M.A. Donelan and F.C. Elder was presented at the 18th Conference on the Great Lakes.

98BC: *Lake Ontario Cross Section Study*

Principal Investigator: M. Munawar - CCIW

This project is complete. A paper resulting from this project was published in the Proceedings, 17th Conference on Great Lakes Research (IAGLR) 1974, entitled, "The Abundance of Diatoms in the Southwest Nearshore Region of Lake Ontario During the Thermal Bar Period" by G.J. Lorefice and M. Munawar.

101BC: *Lake Ontario Primary Production Study*

Principal Investigators: M. Munawar and J.E. Moore

The project has been completed. The following papers have resulted from this project: "Biomass Parameters and Primary Production at a Nearshore and Midlake Station of Lake Ontario During IFYGL" by P. Stadelman and M. Munawar; "Phytoplankton Biomass, Its Species Composition and Primary Production at a Nearshore and Midlake Station of Lake Ontario During IFYGL" by M. Munawar, P. Stadelman and I.F. Munawar.

102BC: *Lake Ontario Diel Pigment Variation*

Principal Investigators: W. Glooschenko and M. Munawar - CCIW

This project is complete. The abstract of the final paper was included in Bulletin No. 12.

103BC: *Pesticide Concentration in Bird's Eggs*

Principal Investigator: M. Gilbertson - CWS

This project is essentially complete. Several papers have resulted to date and are listed in the IFYGL Bibliography under the Principal Investigator.

104BC: *Rain Quality Monitoring*

Principal Investigator: M. Shiomi - CCIW

No report available. See Bulletin No. 9 for last complete report.

107BL: *Air Pollution Sinks*

Principal Investigator: D.M. Whelpdale - AES

This project is complete. Two publications have resulted: "Sulphur Dioxide Removal by Turbulent Transfer Over Grass, Snow and Water Surfaces" by D.M. Whelpdale and R.W. Shaw; and "Sulphate Deposition by Precipitation into Lake Ontario" by R.W. Shaw and D.M. Whelpdale. Both are listed in the IFYGL Bibliography.

108BL: *Lake Level Transfer*

Principal Investigator: G.C. Dohler - MSD

This project is complete.

109WM: *Upwelling Study*

Principal Investigator: G.K. Rodgers - CCIW

The Final Report is in preparation.



110WM: *Hydro Intake Study*

Principal Investigator: A. Arajs - OH

This project was completed with the paper "Nearshore Currents and Water Temperatures Along the North Shore of Lake Ontario Between Pickering and Cobourg" by A.A. Arajs and R. Faroqui. The abstract is presented following the portion, "Canadian Project Reports", of IFYGL Bulletin No. 16.

111WM: *Lakeview Dispersion Study*

Principal Investigator: M.D. Palmer - OME

This project is complete, and all the data have been submitted to the IFYGL Data Bank.

112BC: *Threespine Stickleback*

Principal Investigator: E.T. Garside - Dalhousie University

No report available. Last reported in Bulletin No. 9.

114WM: Included in Project 89WM.

115WM: *Wave Climatology*

Principal Investigator: H.K. Cho - CCIW

The data have been submitted to the Data Bank.

116TW: *Airborne Gamma Ray Snow Survey*

Principal Investigator: H.S. Loijens - IWD, Glaciology

This project is complete; however, research in the use of natural gamma radiation for snow-water equivalent and soil moisture determination is continuing.

117ME: *APT Photographs*

Principal Investigator: J.A.W. McCulloch - AES

This project is now completed. The microfilm is on file at the IFYGL Data Bank.

118: *Canadian IFYGL Data Bank*

Principal Investigator: J. Byron - CCIW

Cat. No. 3-118-045	IFYGL Bulletin No. 15
Cat. No. 3-118-046	IFYGL Bulletin No. 16
Cat. No. 3-118-047	IFYGL Bulletin No. 17
Cat. No. 3-118-048	Technical Manual Series - No. 6 "IFYGL Rawinsonde Data Acquisition System"
Cat. No. 3-118-049	Technical Manual Series - No. 7 "Operation Characteristics of the DECCA LAMBDA (6f) Positioning System Over Fresh Water".

UNITED STATES

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## LAKE ONTARIO TEMPERATURE AND CURRENT PROFILES

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Horizontal distributions of temperatures and currents during IFYGL were shown in IFYGL Bulletin Nos. 15, 16, and 17. This note shows the vertical distribution of these variables. Tables 1 and 2 contain averages from all sensors at the same depth for 3-day periods, which were chosen because each contains a whole number of daily and nearly a whole number of inertial periods.

Table 1 shows air and water temperature averages. The different fonts used in the table distinguish water  $4^{\circ}\text{C}$  or colder and water above the thermocline.

The water column is nearly isothermal until warm air in late May produces small vertical surface gradients. In June the lake surface is warming rapidly, but not uniformly. By late June a thermocline forms, but not until July does it strengthen and deepen. The warmest temperature of the year occurs on July 20, but a storm quickly mixes and cools this warm surface water. By August the sensors needed servicing, so there are missing data in both tables in August. Storms in September weaken and deepen the thermocline. On October 9 the most violent storm of the year brought strong, cold winds that produced intense stirring in the lake and also damaged many sensors. Only scattered data were obtained after this storm, but they show a gradual return to an isothermal lake.

Table 2 shows a similar presentation for wind and current speeds. Different fonts are again used to contrast higher and lower speeds.

In May the isothermal lake has about the same current speeds at all depths. (Vertical changes of a few  $\text{cm s}^{-1}$  are not significant because of variations in the number and kind of sensors at each level.) As the lake starts to stratify in June, vertical current shear develops. The impact of a storm on June 23 is evident in the high surface speed. In July shear continues to develop in the column. By August strong stratification isolates deep waters from the effects of the wind so that  $10 \text{ cm s}^{-1}$  differences in current speed exist from the top to the bottom of the lake. September shows more of the same--higher surface speeds and low bottom speeds. Once again the October storm can be seen to stir the column, mix down the high surface speeds, and tear up the sensors.

[illegible][illegible]





LAKE ONTARIO MECHANICAL ENERGY

R. L. Pickett and S. Bermick  
Great Lakes Environmental Research Laboratory  
Ann Arbor, Michigan

Abundant temperature and current data obtained by the IFYGL buoy and tower network allowed the calculation of mechanical energy in Lake Ontario during part of 1972.

Kinetic energy was calculated from current speeds:

$$\text{kinetic energy} = \int_V \frac{1}{2} \rho s^2 dV,$$

where

$\rho$  = density of water,  
 $s$  = current speed at each meter, and  
 $V$  = lake volume.

This definition was approximated by assuming that the 19 buoy and towers were equally distributed around the lake, and that density variations were small compared to current speed variations ( $\rho \sim 1$ ), so that:

$$\text{kinetic energy} \sim \frac{1}{2} A \int_z \overline{s^2} dz,$$

where

$A$  = area of lake,  
 $z$  = depth (positive downward), and

$\overline{s^2}$  = lake-average current speed squared in each vertical layer.

Values from the above expression for each month of the Field Year are given in table 3.

Potential energy calculations required a reference state. The definition is

$$\text{potential energy} = \int_V \rho g z dV,$$

where

$g$  = gravity.

Since the simplest reference state is a 4°C lake, the formula used was:

$$\text{relative potential energy} = \int_V (\rho - 1) g z dV.$$

Table 3.--Monthly mean energy ( $J \times 10^{11}$ ) in Lake Ontario

Month	Kinetic	Potential *	Available potential †
May	1.3	5	0
June	5.3	27	2
July	2.6	187	15
Aug.	4.9	473	18
Sept.	5.2	652	32
Oct.	9.4	599	33

\* Relative to 4°C.

† Assuming two homogenous layers.

The density at each temperature sensor was calculated from an equation of state, subtracted from 1, and summed over all depths and stations to give the values in table 3.

Although the above calculation gave relative potential energy, the majority of this energy resided in vertical stratification and was unavailable for conversion to kinetic energy. To estimate the portion of relative potential energy available for kinetic conversion, the simple two-layer method was used. The lake was assumed to consist of two homogenous layers. The layer thicknesses and mean temperatures were estimated from the temperature data. Available potential energy was calculated from:

$$\text{available potential energy} = 1/2 \rho_1 \frac{\rho_2 - \rho_1}{\rho_2} g (\overline{h^2} - \overline{h}^2),$$

where

$\rho_1$  = upper layer density,

$\rho_2$  = lower layer density, and

$\overline{h}$  = thermocline depth (overbar indicating average).

The results of these calculations are also given in table 3.

Table 4 is included to show how other properties of the lake correlate with energy. Kinetic energy, for example, correlates directly with wind speed; as the mean wind speed increases, so does the mean kinetic energy. The maximum value of kinetic energy, due to storms in October 1972, was almost an order of magnitude larger than the May value. Relative and available potential energy, on the other hand, correlate best with lake-air temperature difference. Potential energy is highest when the lake is warmer

than the air. Apparently the influence of this temperature difference on both the wind drag coefficient and the heat flux into the lake account for these correlations. Relative potential energy increases two orders of magnitude from spring to fall, but available potential increases are more modest

*Table 4.--Lake Ontario monthly mean data*

	Wind speed (m s <sup>-1</sup> )	Lake surface temperature (°C)	Air temperature (°C)	Lake minus air temperature (°C)
May	2.8	4	9	-5
June	3.6	9	12	-3
July	3.1	18	19	-1
Aug.	3.2	19	19	0
Sept.	4.4	18	17	1
Oct.	5.0	13	10	3



## IFYGL - AN UNUSUALLY COLD YEAR

J. L. Grumblatt  
Great Lakes Environmental Research Laboratory  
Ann Arbor, Michigan

Water temperature monitoring stations operating on the Great Lakes (fig. 1) since 1965 have provided continuous records that show IFYGL (1972) as an unusually cold year throughout the Great Lakes basin.

The equipment at most stations consists of resistance thermometers connected to continuous strip-chart recorders. The thermometers are 3 m below International Great Lakes Datum to avoid their being influenced by short-term air temperature variations. Sensor accuracy is  $0.2^{\circ}\text{C}$ , and system accuracy is  $0.5^{\circ}\text{C}$ . Several times a week the system is checked manually against bucket thermometer temperatures. Stations installed since 1972 are digital recorders that output every hour on punched paper tape. Sensor accuracy is still  $0.2^{\circ}\text{C}$ , but system accuracy is  $0.3^{\circ}\text{C}$ .

Two additional stations were added for IFYGL. One was at Lewiston, N.Y., in the Lower Niagara River to measure Lake Ontario inflow temperatures; the other was at Cape Vincent, N.Y., to measure outflow temperatures. Data from five stations in the network are shown in fig. 2. The stations were:

St. Lawrence River. This station at Ogdensburg, N.Y., records river temperatures approximately 60 mi downstream from Lake Ontario. The lowest annual mean water temperature of  $8.4^{\circ}\text{C}$  occurred in 1972 and the highest of  $10.5^{\circ}\text{C}$  in 1973.

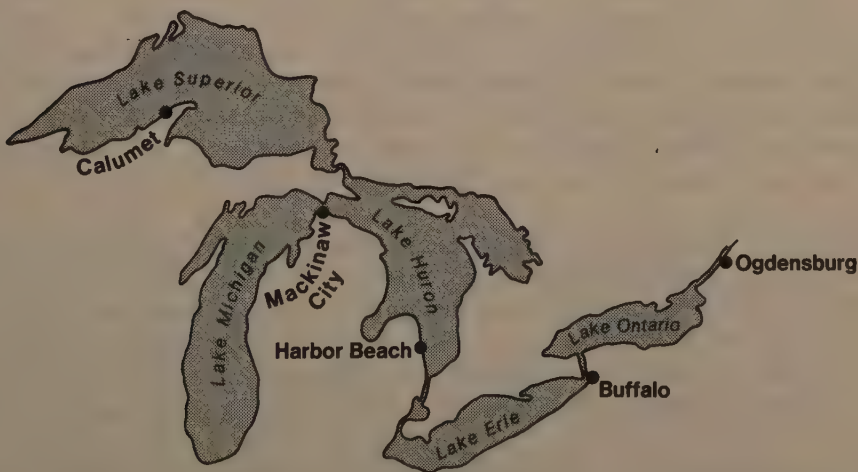


Figure 1.--Location of water temperature monitoring stations.

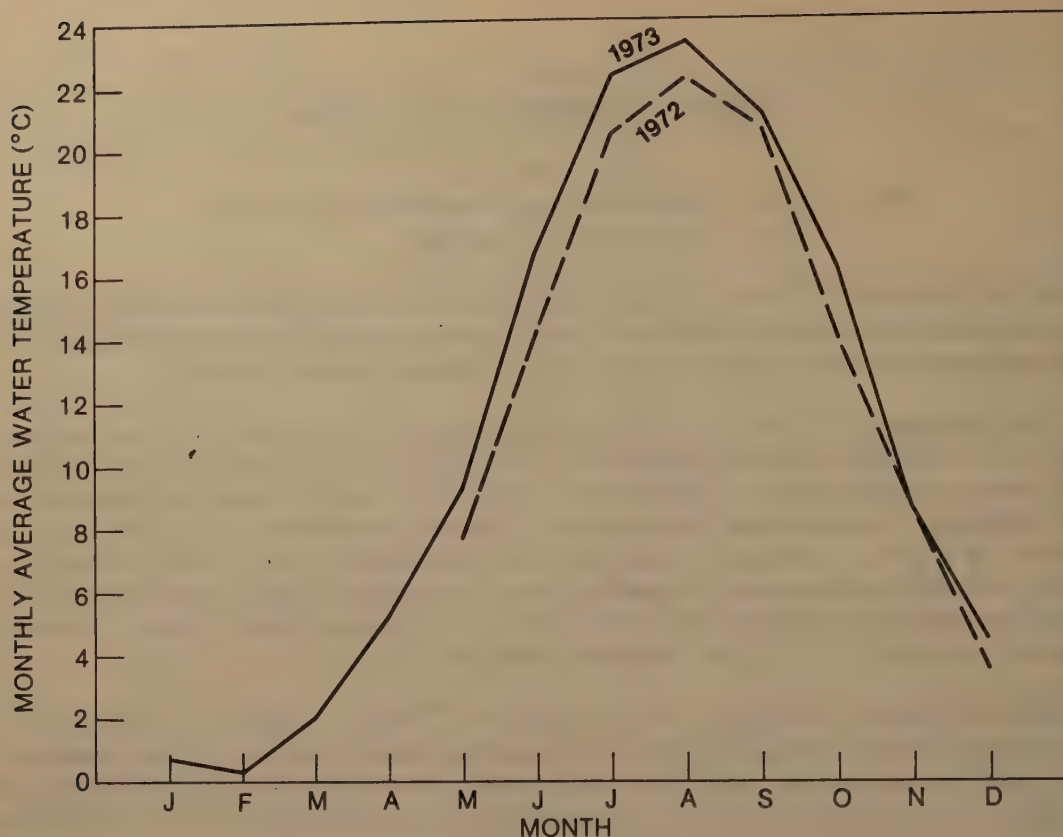


Figure 2.--Annual average water temperature at five monitoring stations.

Lake Erie. The monitoring station at Buffalo, N.Y., provides approximate data on the temperature of Lake Erie outflow to the Niagara River. Here, too, the lowest annual mean of 9.4°C occurred in 1972 and the highest of 11.2°C in 1973. The water temperature at this station is sometimes strongly influenced by persistent ice driven to the east end of Lake Erie by prevailing winds. Water moving under the ice toward the outlet of the lake is cooled to 0°C by the time it reaches the Niagara River. For example, Lake Erie outflow water temperatures were a steady 0°C as late as May 26 in 1971, and the mean temperature at this station in 1971 reflects this event.

Lake Huron. The station at Harbor Beach, Mich., provides nearshore temperatures along western Lake Huron south of Saginaw Bay. Water temperature at this station is subject to frequent variations due to wind-inducing upwelling during the summer. Once again the lowest annual mean temperature (8.3°C) was in 1972, but the highest (9.4°C) occurred in both 1966 and 1967. The second highest temperature (9.1°C) occurred in 1970 and 1973.

Straits of Mackinac. The station at Mackinaw City, Mich., records temperatures at the juncture of Lakes Michigan and Huron. The lowest temperature of 7.0°C was recorded in 1972, but highs of 8.2°C occurred in both 1966 and 1973.

Lake Superior. Along the west shore of the Keewenaw Peninsula, lake temperatures are also subject to frequent summer upwelling. The temperature of  $5.8^{\circ}\text{C}$  in 1972 was the lowest, and  $7.6^{\circ}\text{C}$  in 1973 was the highest.

This pattern of a cold 1972 followed by a warm 1973 can also be seen in the special IFYGL stations begun in May 1972. Figures 3 and 4 show the month-to-month contrast of these Lake Ontario inflow and outflow stations.

From these data one can see that lake temperatures during 1972 were the lowest for the period of record for the entire Great Lakes drainage basin. Obviously IFYGL was an unusually cold year followed by an unusually warm year.

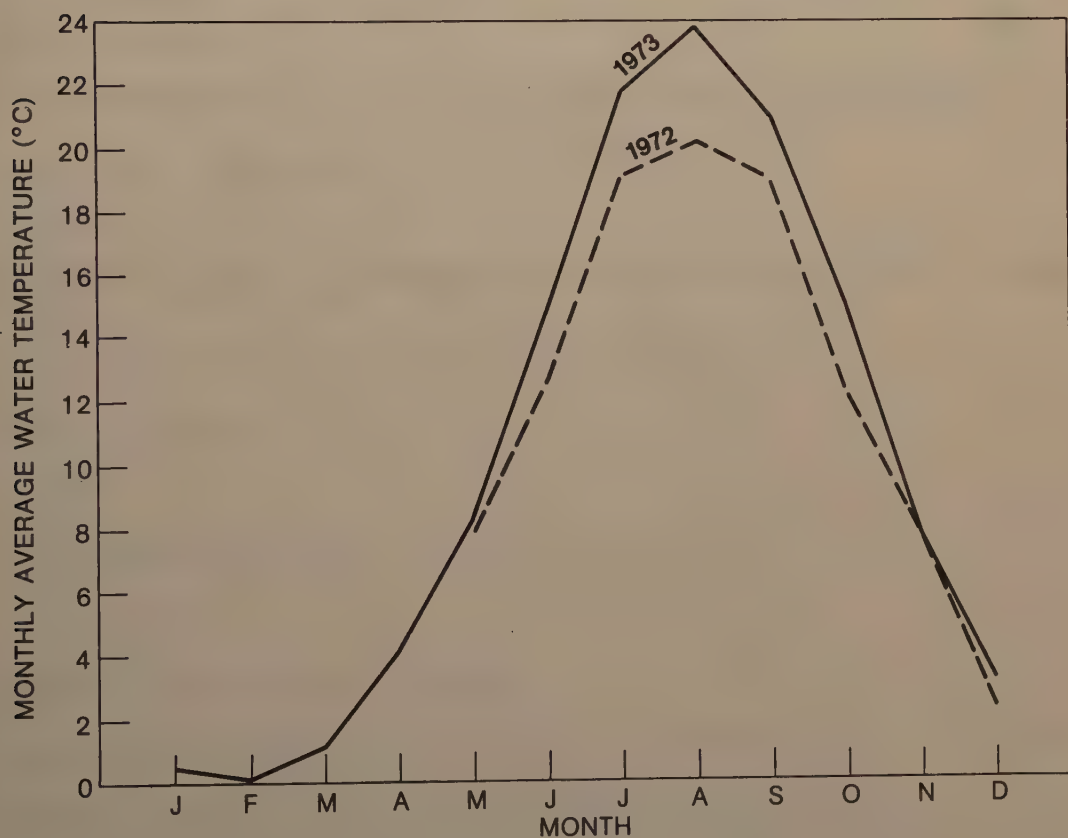


Figure 3.--Lake Ontario inflow water temperature at Lewiston, N.Y.

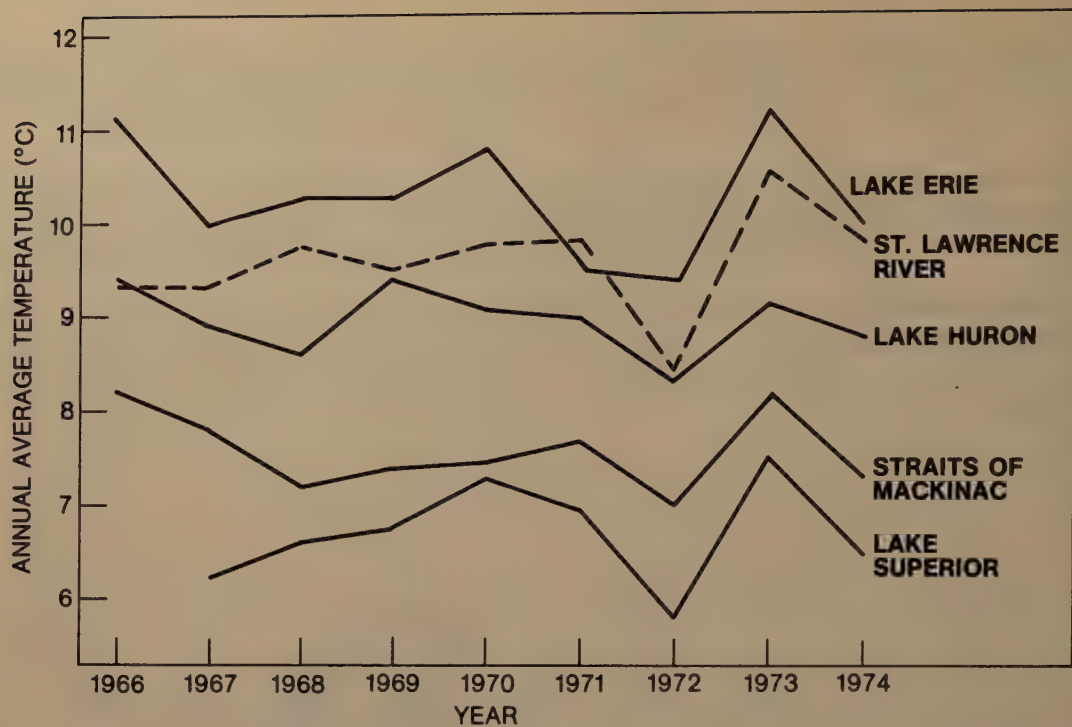


Figure 4.--Lake Ontario outflow water temperature at Cape Vincent, N.Y.



## U.S. SCIENTIFIC PROGRAM

Based upon reports requested by the U.S. IFYGL Project Office, the progress from October 1 through December 30, 1975, is presented for each of the U.S. IFYGL tasks. Some reports cover work done in January and February. Results of task work can be found by referring to the bibliography in the front of this issue and in the Data Management section under the Principal Investigators' names and the task number.

### Tasks

#### 1. *Phosphorus Release and Uptake by Lake Ontario Sediments*

Principal Investigators: D. E. Armstrong and R. F. Harris - University of Wisconsin

Task completed.

#### 2. *Net Radiation*

Principal Investigator: M. A. Atwater - CEM

Task completed.

#### 3. *RFF/DC-6 Boundary Layer Fluxes*

Principal Investigator: B. R. Bean - ERL/NOAA

Task completed.

#### 4. *Nitrogen Fixation*

Principal Investigator: R. Burris - University of Wisconsin

Task completed.

#### 5. *Profile Mast and Tower Program*

Principal Investigator: J. A. Businger - University of Washington

We have completed the analysis of surface layer profiles and of turbulent fluxes computed by fitting them. The analysis and the conclusions reached are presented by Steven A. Stage in a 1976 Master of Science thesis entitled "Profile Measurements in the Atmospheric Surface Layer Over Lake Ontario During the International Field Year for the Great Lakes." The abstract of the thesis is as follows:

"A description is given of profile measurements in the atmospheric surface layer at Cobourg, Ontario, and at Rochester, New York, over Lake Ontario during the October 1972 intensive period of the

International Field Year for the Great Lakes (IFYGL). Businger-Dyer and log-linear profile theories are briefly described and a simple iterative scheme for solving the profile equations is given, which is used to analyze the data. The time history of the data is dominated by two fronts which passed during the experiment. Latent heat accounted for 78 percent of the total turbulent transfer of heat to the air at Cobourg and 75 percent at Rochester. The stability effects of water vapor were frequently 7 to 40 percent of the thermal stability effects. When allowance is made for surface drift currents having magnitudes of two to three times the friction velocity,  $u_*$ , the data follow the aerodynamically smooth relationship,  $z_o = v_2/9u_*$  for  $u_* \leq 10.2$  cm/sec and follow Charnock's relationship,  $z_o = au_*/g$ , with  $a = 0.0156$  as given by Wu (1969)<sup>1</sup> for  $u_* \leq 10.2$  cm/sec."

"When the data are analyzed in the manner used by Sheppard et al. (1972)<sup>2</sup>, a 'smoother than smooth' behavior is found which resembles the results of that paper; however, arguments are given that his method of analysis is misleading. These data do not show peaks of  $z_o$  at values of wind speed as found by Ruggles (1970)<sup>3</sup>, but the difference between Ruggles' results and those reported here may conceivably be due to the different fetches and averaging times."

"At the Cobourg site for offshore (north or northwest) winds the change of roughness parameter,  $m$ , is estimated to have values at least as large as 6 to 13; the height-to-fetch ratio of the top profile level is 1/180 to 1/300. For Obukhov lengths,  $L$ , such that  $1/L$  is greater than  $-6 \times 10^{-3}$  cm<sup>-1</sup>, the profiles at the measurement levels are far enough from fully modified to give unrealistically low relative humidities at  $z_o$  when they are extrapolated to that level. This is reasonable in light of change of roughness model results for  $m = 4.83$ , which indicate nearly fully modified height-to-fetch ratios of 1/200 for neutral conditions. These results point to a need for more complete theoretical investigation of the behavior of surface layer response to changes in surface conditions, particularly for large changes of roughness and for heat and vapor flux changes."

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<sup>1</sup> Wu, J., "Wind Stress and Surface Roughness at Air-Sea Interface," Journal of Geophysical Research, Vol. 74, No. 2, 1969, p. 444.

<sup>2</sup> Sheppard, P.A., D.T. Tribble, and J.R. Garratt, "Studies of Turbulence in the Surface Layer Over Water (Lough Neagh), Part 1, Instrumentation, Programme, Profiles," Quarterly Journal of the Royal Meteorological Society, Vol. 98, 1972, pp. 627-641.

<sup>3</sup> Ruggles, K.W., "The Vertical Mean Wind Profile Over the Ocean for Light to Moderate Winds," Journal of Applied Meteorology, Vol. 9, 1970, pp. 389-395.

The thesis is available from the IFYGL Archive. Also available from the Archive are punched cards containing the calculated profiles and fluxes and a description of the cards on microfiche. The next phase of our analysis will be to compute the eddy-correlation fluxes from our data and to use similarity theory to investigate their behavior.

6. *Status of Lake Ontario Fish populations*

Principal Investigator: J. H. Kutkuhn - Great Lakes Fisheries Laboratory

No activity this quarter.

7. *Material Balance of Lake Ontario*

Principal Investigator: D. J. Casey - EPA

No report.

8. *Runoff*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Task completed.

9. *Evaporation (Lake-Land)*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Monthly data for all terms of the lake equation for the water budget, except for change in storage, are available. Work has begun on compiling these terms on a weekly basis. This task should be completed by June 1976.

0. *Simulation Studies and Analyses Associated With the Terrestrial Water Balance*

Principal Investigator: B. G. DeCooke - U.S. Army Corps of Engineers

Activity has not begun.

1. *Land Precipitation Data Analysis*

Principal Investigator: J. R. Weiser - U.S. Army Corps of Engineers

No progress this quarter.

2. *Transport Processes Within the Rochester Embayment of Lake Ontario*

Principal Investigator: J. H. Thomas - University of Rochester

Task completed.



13. *Soil Moisture and Snow Hydrology*

Principal Investigator: W. N. Embree - U.S. Geological Survey

The final report is still in review within the USGS.

14. *Boundary Layer Structure and Mesoscale Circulation*

Principal Investigator: M. A. Estoque - University of Miami

See Task 15 below.

15. *Mesoscale Simulation Studies*

Principal Investigator: M. A. Estoque - University of Miami

Progress is being made in the observational as well as the numerical three-dimensional modeling of lake-effect storms over Lake Ontario. Two storms are being studied, which occurred on October 8-9, and December 6-7, 1972. Our article entitled "A Lake Breeze Over Southern Lake Ontario" has been accepted for publication in a future issue of the Monthly Weather Review.

16. *Water Transfer Across Large Lake*

Principal Investigator: H. W. Stoughton - State University of New York at Alfred

The bibliography on the state-of-the-art on water-level transfer techniques is about 97 percent complete. A statistical analysis of the level observation network was begun.

17. *Nearshore Ice Formation, Growth, and Decay*

Principal Investigator: J. Dilley - General Electric Company

Work on improving the eddy diffusivity model has been completed. Improvements include accounting for wave, current, and convective mixing; a variable thickness snow cover capability that provides the desired surface insulation and reflection characteristics; and more accurate schemes for heat transfer and for computation of the motion of freezing and melting phase fronts.

Most of the meteorological data requested have been received, including the radiation fluxes generated by M. Atwater at CEM. Simulations of the three ice periods at Nine Mile Point are in progress. Data from the Physical Data Collection System (PDCS) are being used with the radiation data to compute the net surface heat transfer. The first period being run covers the 3 weeks from January 4 through January 26, 1973. Results are being compared with the water temperature measurements and the ice cover as recorded by time-lapse photography.



The model will also be applied to Olcott, Cobourg, and Kingston, and the entire lake ice distribution will be estimated based on a parametric interpolation between these locations. Final results will be in the form of a time history of the latent heat released from the whole lake.

18. *Advection Term - Energy Balance*

Principal Investigator: J. Grumblatt - LSC/NOAA

A limited amount of work was done during the quarter. Estimated completion date for the final report has been moved to March 1976. A short article entitled "IFYGL - An Unusually Cold Year" was prepared and appears in this issue of the Bulletin.

19. *Occurrence and Transport of Nutrients and Hazardous Polluting Substances in the Genesee River Basin*

Principal Investigator: L. J. Hetling - New York State Department of Environmental Conservation

Task Completed.

20. *Boundary Layer Flux Synthesis*

Principal Investigator: J. A. Almazan - CEDDA/NOAA

The study of the effects of atmospheric stability and overwater fetch on the wind speeds over Lake Ontario has been completed, based on meteorological data from the Canadian and United States buoys and towers and from the weather stations around the lake. The data from the Canadian coastal stations has become available and will be included in the final analysis. The results obtained so far indicate a definite increase in wind speed as a function of stability. An abstract of a paper dealing with this study has been submitted for presentation at the 19th Conference on Great Lakes Research in May 1976.

Abstracts of two other papers have also been submitted for presentation at the above conference. One deals with the climatology of the lake in 1972; the other, with the results of the low-level averaged vorticity and divergence fields over the lake from May through November 1972.

The Evaporation Synthesis Group and the Lake Energy Budget Panel have been provided with weekly averages for each buoy station of  $S \times \Delta q$  and  $S \times \Delta t$ , where  $S$  is wind speed,  $\Delta q$  is the air-lake difference in specific humidity, and  $\Delta t$  is the air-lake air temperature difference. These averages will be used to obtain estimates of the energy fluxes from bulk aerodynamic relationships for the May-October 1972 period.

21. *Hazardous Material Flow*Principal Investigator: G. F. Lee - University of Texas at Dallas

The final report is still in preparation.

22. *Remote Measurement of Chlorophyll With Lidar Fluorescent System*Principal Investigator: H. H. Kim - NASA

Task completed.

23. *Inflow/Outflow Term - Terrestrial Water Budget*Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

Task completed.

24. *Use of an Unsteady State Flow Model to Compute Continuous Flow*Principal Investigator: P. L. Cox - U.S. Army Corps of Engineers

No progress this quarter.

25. *Radiant Power, Temperature, and Water Vapor Profiles Over Lake Ontario*Principal Investigator: P. M. Kuhn - ERL/NOAA

Work completed.

26. *Algal Nutrient Availability and Limitation in Lake Ontario*Principal Investigator: G. F. Lee - University of Texas at Dallas

The final report is being printed.

27. *Wave Studies*Principal Investigator: P. C. Liu - GLERL/NOAA

Analysis of the IFYGL wave data continues.

28. *Cloud Climatology*Principal Investigator: W. A. Lyons - University of Wisconsin,  
Milwaukee

Planimetering of the solarimeter data obtained over a 15-month period at Griffis AFB, Rome, N.Y., and at Lakeside Park, N.Y., is nearing completion. This work is being done to obtain hourly sums of insolation compatible with IFYGL data requirements. The data, including hourly means

and monthly sums, will be prepared on data sheets for each station for each month. A report describing how the data were obtained and analyzed will be written and will be submitted in published project report form to the IFYGL archive in the spring of 1976.

Concentrated effort will begin in preparing the mesoscale daily insolation maps for the Lake Ontario basin with the aid of all solarimeter data, satellite pictures, surface reports, and other sources.

9. *Zooplankton Production in Lake Ontario as Influenced by Environmental Perturbations*

Principal Investigator: D. C. McNaught - State University of New York at Albany

Task completed.

10. *Change in Lake Storage Term - Terrestrial Water Budget*

Principal Investigator: R. Wilshaw - U.S. Army Corps of Engineers

End-of-period levels to calculate the change in storage should be available early in April 1976.

1. *Soil Moisture*

Principal Investigator: L. T. Schutze - U.S. Army Corps of Engineers

Work not begun.

2. *Testing of COE (Corps of Engineers) Lake Levels Model*

Principal Investigator: E. Megerian - U.S. Army Corps of Engineers

This task has been canceled.

3. *Nearshore Study of Eastern Lake Ontario*

Principal Investigator: R. B. Moore - State University of New York at Oswego

Task completed.

4. *Internal Waves - Transects Program - Interpretation of Whole-Basin Oscillations*

Principal Investigator: C. H. Mortimer - University of Wisconsin, Milwaukee

No report.

35. *Pontoporeia affinis and Other Benthos in Lake Ontario*Principal Investigator: S. C. Mosley - University of Michigan

No report.

36. *Pan Evaporation Project*Principal Investigators: C. N. Hoffeditz - NWS/NOAA  
J. A. W. McCulloch - AES, Canada

No report.

37. *Simulation Studies and Other Analyses Associated With U.S. Water Movements Projects*Principal Investigators: J. P. Pandolfo and C. A. Jacobs - CEM

Task completed.

38. *Structure of Turbulence*Principal Investigator: H. A. Panofsky - Pennsylvania State University

Task completed.

39. *Airborne Snow Reconnaissance*Principal Investigator: E. L. Peck - NWS/NOAA

Task completed.

40. *Optical Properties of Lake Ontario*Principal Investigator: K. R. Piech - Calspan Corporation

No report.

41. *Storage Term - Energy Balance Program*Principal Investigator: A. P. Pinsak - GLERL/NOAA

The magnetic tapes containing all the bathythermograph data from the Researcher and Advance II have been reviewed. The tapes were cross-indexed by cruise and station and printouts were made to assess the quantity and quality of the data and to begin editing and making necessary corrections. The data, catalogued by cruise and station, have been placed on cards for ready use in temporal and spatial analyses. There are sizeable gaps in the data, which will require searching all other possible sources of temperature data.



42. *Sensible and Latent Heat Flux*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

All dewpoint observations from the meteorological buoys have been extracted from the IFYGL Archive tapes, edited, and daily averages prepared for use in calculating Bowen ratios for the entire lake.

43. *Thermal Characteristics of Lake Ontario and Advection Within the Lake*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

This task is a follow-up of Task 41 and is inactive pending completion of that task.

44. *Oswego Harbor Studies*

Principal Investigator: G. L. Bell - GLERL/NOAA

Work continues on the final report.

45. *Mapping of Standing Water and Terrain Conditions With Remote Sensor Data*

Principal Investigator: F. C. Polcyn - ERIM

Task completed.

46. *Remote Sensing Program for the Determination of Cladophora Distribution*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

47. *Remote Sensing Study of Suspended Inputs Into Lake Ontario*

Principal Investigators: F. C. Polcyn and C. T. Wezernak - ERIM

Task completed.

48. *Island-Land Precipitation Data Analysis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

A report entitled "Eastern Lake Ontario Precipitation Network" has been published as NOAA Technical Memorandum ERL GLERL-5. Indicator equations for the U.S. basin have been verified with independent data sets, but do not appear as favorable as first believed. An informational report is being prepared.

49. *Lake Circulation, Including Internal Waves and Storm Surges*

Principal Investigator: D. B. Rao - GLERL/NOAA

Task completed.

50. *Atmospheric Water Balance*

Principal Investigator: E. M. Rasmusson - CEDDA/NOAA

Evaporation estimates have been obtained from atmospheric water balance computations for the three periods of intensive rawinsonde observations (October 2 to 18, October 31 to November 14, and November 21 to December 5, 1972). Average weekly values of evaporation for 6 separate weeks were derived, and were compared with similar averaged values derived by the bulk aerodynamic method from two different data sets (one provided by McCulloch, the other by Elder and his colleagues). All estimates showed the same qualitative trends when plotted as a time series, but the atmospheric water balance estimates were typically 70 to 75 percent larger than those obtained from the bulk aerodynamic computations.

Work during the next quarter will be concentrated on preparing the final report on the water balance investigations and on examining the results from the atmospheric heat budget computations.

51. *Evaporation Synthesis*

Principal Investigator: F. H. Quinn - GLERL/NOAA

Analysis has begun of first-cut evaporation data by the atmospheric water balance, mass transfer, and terrestrial water balance methods, with initial emphasis being given to the two latter techniques.

52. *Groundwater Flux and Storage*

Principal Investigator: E. C. Rhodehamel - U.S. Geological Survey

Task completed.

53. *Spring Algal Bloom*

Principal Investigator: A. Robertson - GLERL/NOAA .

This task has been canceled.

54. *Ice Studies for Storage Term - Energy Balance*

Principal Investigator: F. H. Quinn - GLERL/NOAA

Task completed.

5. *Lagrangian Current Observations*

Principal Investigator: J. H. Saylor - GLERL/NOAA

No activity this quarter.

6. *Circulation of Lake Ontario*

Principal Investigator: J. H. Saylor - GLERL/NOAA

No activity this quarter.

7. *Phytoplankton Nutrient Bioassays in the Great Lakes*

Principal Investigator: C. Schelske - University of Michigan

Task not activated.

8. *Runoff Term of Terrestrial Water Budget*

Principal Investigator: G. K. Schultz - U.S. Geological Survey

Task completed.

9. *Coastal Chain Program*

Principal Investigator: J. T. Scott - State University of New York  
at Albany

The calculation of current roses, mean temperatures and transverse and alongshore velocity components for selected events has been completed. Plots of measured and baroclinic geostrophic transport for individual days and events at all five coastal chains have been drawn. This new information is now being incorporated into reports.

In the next quarter, we plan to run the baroclinic geostrophic calculations for additional "events", which will complete the second phase of the data analysis, and continue the drafting of the figures. We also hope to publish our Coastal Chain Program Report 2, and a paper entitled "On the Cyclonic Resultant Transport in Lake Ontario," by D. R. Landsberg and J. T. Scott, is being prepared for submission to the Journal of Great Lakes Research. We are beginning preparation of our final report.

10. *Analysis of Phytoplankton Composition and Abundance*

Principal Investigator: E. F. Stoermer - University of Michigan

Task completed.

61. *Clouds, Ice, and Surface Temperature*Principal Investigator: A. E. Strong - NESS/NOAA

Task completed.

62. *Analysis and Model of the Impact of Discharges From the Niagara and Genesee Rivers on Nearshore Biology and Chemistry*Principal Investigator: R. A. Sweeney - State University of New York at Buffalo

Task completed.

63. *NCAR/DRI - Buffalo Program*Principal Investigator: J. W. Telford - Desert Research Institute, University of Nevada

No report.

64. *Mathematical Modeling of Eutrophication of Large Lakes*Principal Investigator: R. V. Thomann - Manhattan College

No report.

65. *Cladophora Nutrient Bioassay*Principal Investigator: G. F. Lee - University of Texas at Dallas

The final report is being printed.

66. *Sediment Oxygen Demand*Principal Investigator: N. A. Thomas - EPA

The draft on the final report has undergone internal review. A revised version is being prepared and will be submitted to the IFYGL Archive and to a scientific journal.

67. *Main Lake Macrobenthos*Principal Investigator: N. A. Thomas - EPA

A paper on the November 1972 collections has been submitted to the Journal on Great Lakes Research. A draft covering the entire benthos program has been prepared and is undergoing internal review.



8. *Exploration of Halogenated Hazardous Chemicals in Lake Ontario*

Principal Investigators: G. F. Lee - University of Texas at Dallas  
C. L. Haile - University of Wisconsin

Task completed.

9. *Basin Precipitation - Land and Lake*

Principal Investigator: J. W. Wilson - CEM

Twenty-eight precipitation maps for the Lake Ontario basin have been prepared on the Calcomp plotter at the National Severe Storms Laboratory. These maps cover individual storms, each month and season, and the entire Field Year. They will be included in the IFYGL Atlas and in the report on "Radar-Gage Precipitation Measurements During the IFYGL." The latter report, which was distributed last November, deals with the procedures used to obtain the final precipitation measurements, daily measurements for the entire Field Year, accuracy figures, and land-lake differences.

A paper entitled "Radar-Rain Gage Precipitation Measurements: A Summary" has been prepared and submitted for presentation at the First National Conference on Hydro-Meteorology to be held in Fort Worth, Texas, in April 1976. This paper contains a discussion of the accuracy of the IFYGL precipitation measurements and compares them with the accuracy of other radar-gage measurements made at other locations.

A first draft of CEM's input to volume 3 (precipitation project) of IFYGL Scientific Report No. 2 has been completed. This material will be combined with input to be provided by D. M. Pollock of AES, Canada.

10. *Evaluation of ERTS Data for Certain Hydrological Uses*

Principal Investigators: D. R. Wiesnet and D. F. McGinnis - NESS/NOAA

Task completed.

11. *Distribution, Abundance, and Composition of Invertebrate Fish Forage Organisms in Lake Ontario*

Principal Investigator: R. F. Heberger, Jr. - Great Lakes Fisheries Laboratory

The final report is still in review.

12. *Coastal Circulation in the Great Lakes*

Principal Investigator: G. T. Csanady - Woods Hole Oceanographic Institution

No report.

73. *Lake Water Characteristics*

Principal Investigator: A. P. Pinsak - GLERL/NOAA

Work is complete.

74. *Snow Observation Network*

Principal Investigator: Robert B. Sykes, Jr. - State University of  
New York at Oswego

Task completed.

75. *Lake Circulation Model*

Principal Investigator: J. R. Bennett - Massachusetts Institute of  
Technology

The new version of the three-dimensional model with increased shore resolution has now been run several times for July 1 to August 15, 1972, a period during which there were two large internal Kelvin wave episodes. Both appear to be better simulated by the model than by the earlier version or by Joe Simons' model at CCIW. The chief reason seems to be that the model can be run with very small friction. There is a noticeable difference in the temperature field for a change in vertical eddy viscosity from 12 to 5  $\text{cm}^2 \text{s}^{-1}$ . For the larger value, the wavelike rebound of the thermocline after upwelling is much less, and consequently the model overestimates vertical motion there. These results are now being prepared for publication.

76. *Lake Ontario Invertebrate Fauna List*

Principal Investigator: A. Robertson - GLERL/NOAA

The benthic component of this list is completed. Distributional information for zooplankton is being added.

77. *Distribution and Variability of Physical Lake Properties*

Principal Investigators: R. L. Pickett and S. Bermick<sup>4</sup> -  
GLERL/NOAA

The last issue of the Bulletin showed monthly mean surface temperatures of Lake Ontario derived from the buoy and tower network during the Field Year. Figures 5 through 17 show similar data at -15 and -30 m.

In May the lake was nearly isothermal, except for slight warming near shore and from the Niagara River. Although June 1972 was the coldest and wettest on record, extensive warming occurred nearshore at -15 m. Southwest winds, however, tended to blow away this warm water at the west end of

<sup>4</sup> S. Bermick has been added as a Coprincipal Investigator on this task.

e lake. At -30 m the lake was still relatively unperturbed. July winds are unusually light (a new record low speed was set at Toronto Island), but they were still sufficient to tip the newly formed thermocline down in the east and southeast enough to touch the -15 m level and even influence the -30 m level. By August the thermocline was severely buckled but below -15 m everywhere except perhaps midlake. Once again this deepening occurred in spite of unseasonably cold weather. (A few surrounding land stations reported freezing temperatures.) Buckling was so severe in the east end of the lake that warm water occurred at -30 m. In September the thermocline was well below -15 m, and again reached -30 m in the east end of the lake due to wind set-up. But deepening of the thermocline did not occur after September. October cooling (coolest October on record) and mixing started eroding the thermocline. By November the lake was nearly isothermal again.

### 3. *Carbon Cycle Model*

Principal Investigators: A. Robertson and B. Eadie - GLERL/NOAA

The first draft documenting this model has been completed and is in review.

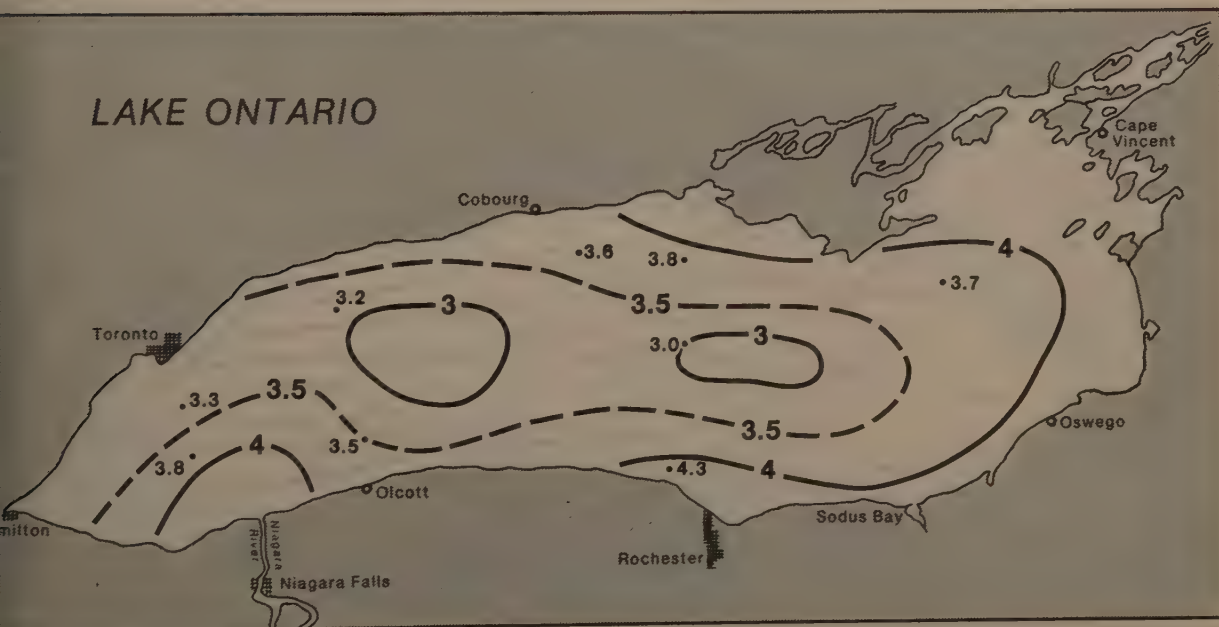


Figure 5.--Monthly mean temperature at -15 m in May.





Figure 6.--Monthly mean temperature at -30 m in May.

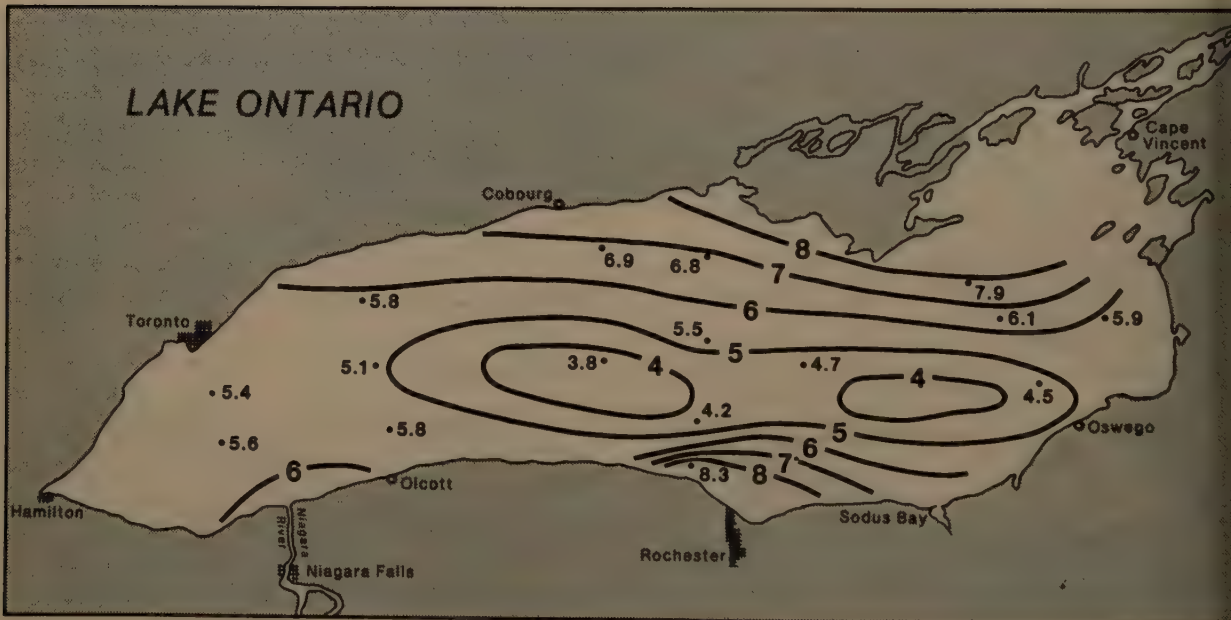


Figure 7.--Monthly mean temperature at -15 m in June.



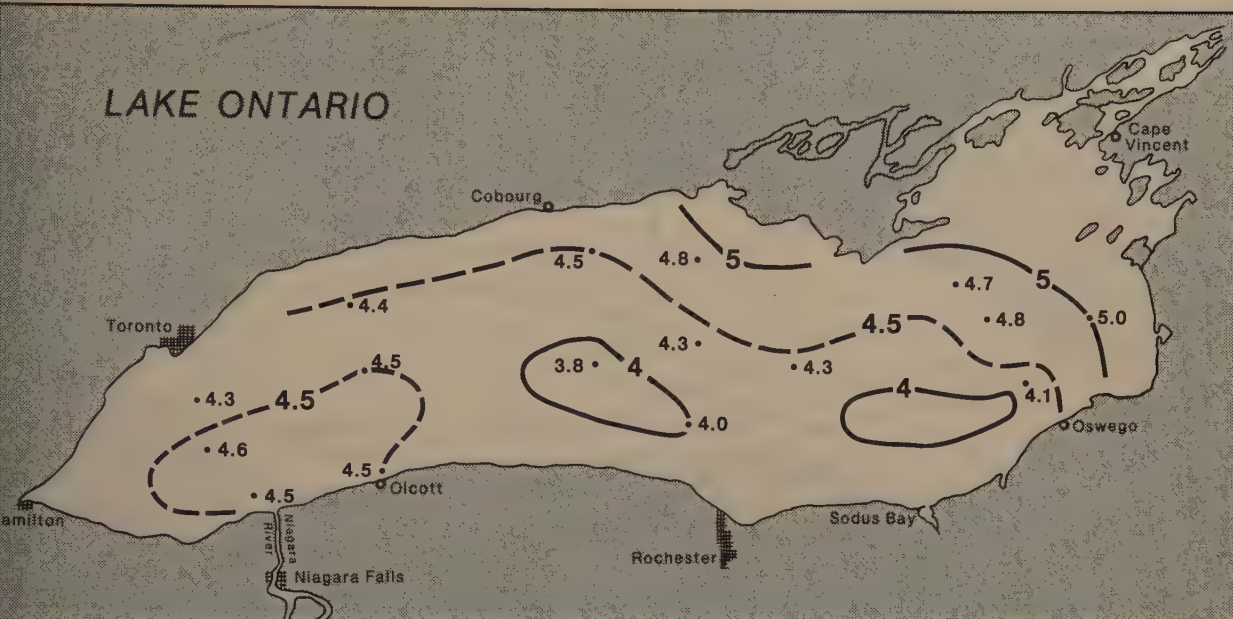


Figure 8.--Monthly mean temperature at -30 m in June.

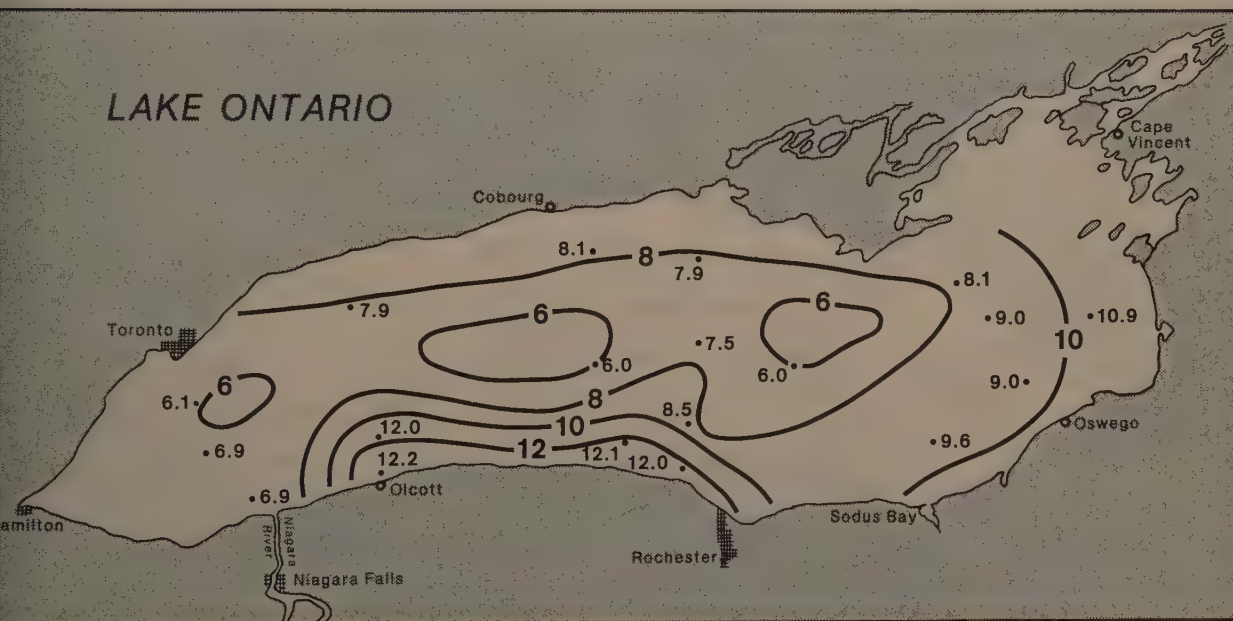


Figure 9.--Monthly mean temperature at -15 m in July.

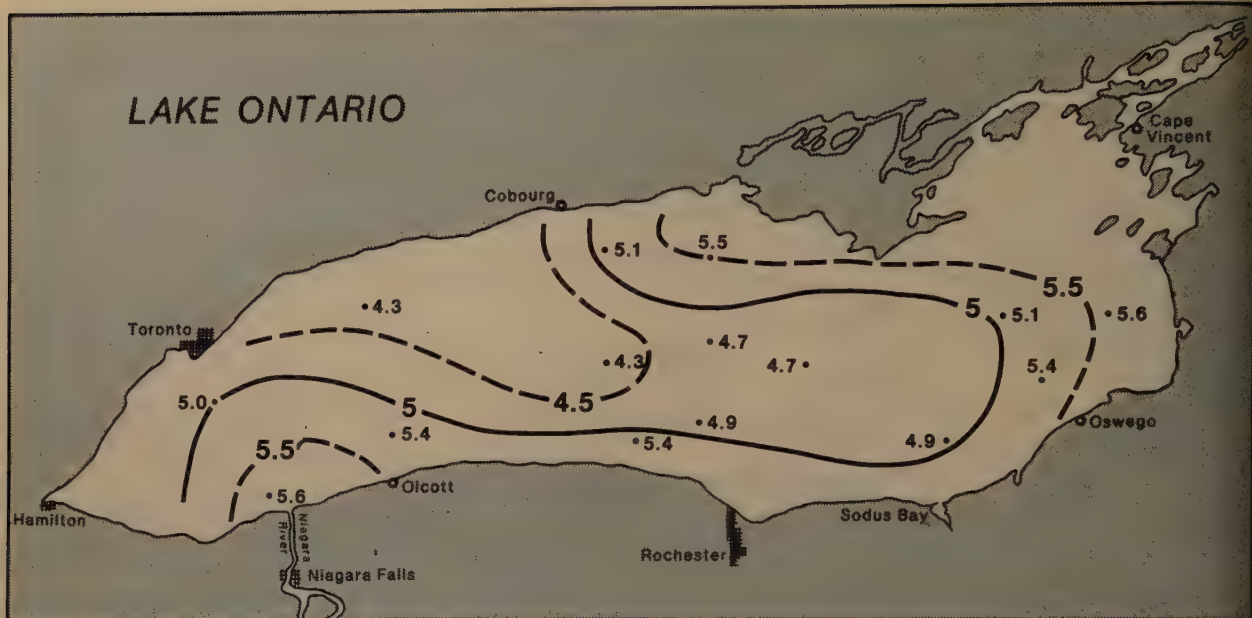


Figure 10.--Monthly mean temperature at -30 m in July.



Figure 11.--Monthly mean temperature at -15 m in August.

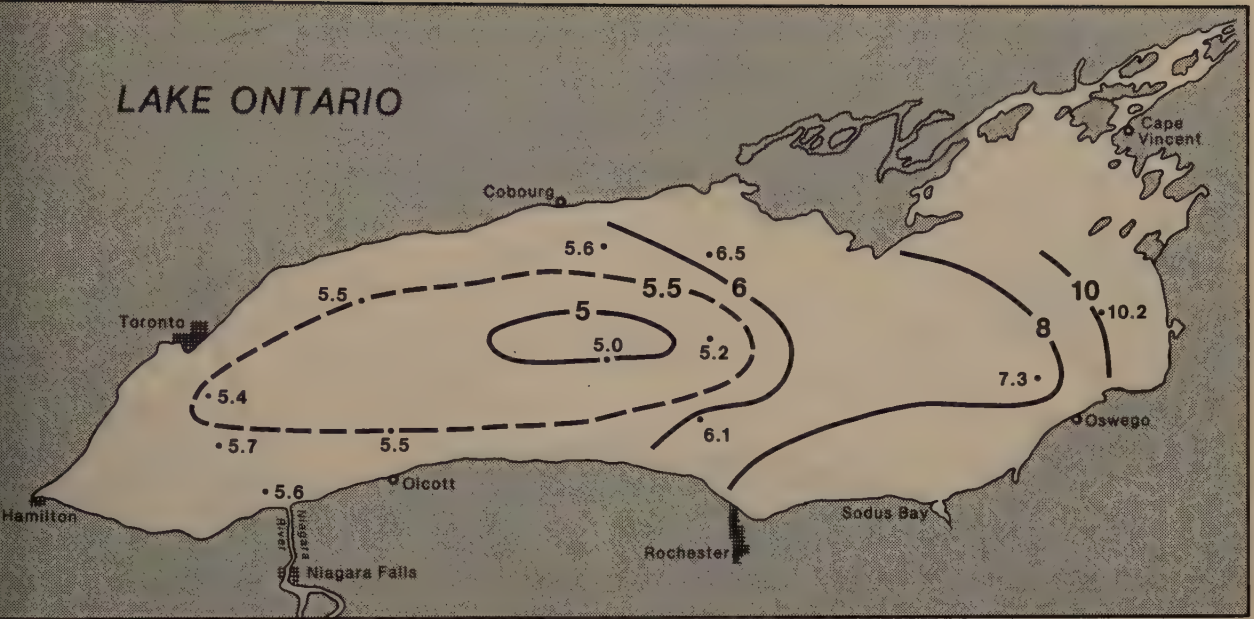


Figure 12.--Monthly mean temperature at -30 m in August.



Figure 13.--Monthly mean temperature at -15 m in September.





Figure 14.--Monthly mean temperature at -30 m in September.



Figure 15.--Monthly mean temperature at -15 m in October.





Figure 16.--Monthly mean temperature at -30 m in October.



Figure 17.--Monthly mean temperature at -15 m in November.

DATA MANAGEMENT - IFYGL ARCHIVEShip System

With the receipt of the 1-s and 6-min microfilm graphics for the Researcher (Task 101) and Advance II (Task 102), the archive for the ship system is virtually complete. A NOAA Technical Report documenting the data is yet to be prepared.

The 1-s graphics are computer-generated displays on microfilm that show wind, temperature, barometric pressure and DECCA readings (a function of position) for each second. They are useful for analyzing portions of the magnetic tape data that appear erratic. There are slightly more than fifty 100-ft 35-mm reels per ship. The 6-min average graphics are compacted on one 35-mm microfilm reel per ship. The elements displayed in the latter set are barometric pressure, fluorometer, dry bulb, dewpoint, lake surface temperature and wind direction, maximum speed and average speed.

Physical Data Collection and Rawinsonde Systems

All data for these systems are in the archive. NOAA Technical Report EDS 14, documenting the rawinsonde system, is ready to go to press. A similar report on the PDCS system is in preparation.

New Accessions

<u>Catalog No.</u>	<u>Description</u>
CDN 3-011-001-001	A hydrologic model of the local Lake Ontario basin (report)
CDN 3-011-002-001	Storage in the water balance of the Lake Ontario basin (report)
CDN 6-038-003-001	Soil moisture data (microfilm)
CDN 3-250-001-002	"Weather data": monthly means and deviations
USA 3-005-006-001	Profile measurements in the atmospheric surface layer (report)
USA 3-012-012-007	Report 2: Sensitivity of a numerical model
USA 3-058-008-001	Streamflow in the Lake Ontario drainage basin, N.Y. part (report)
USA 6-101-007-001	<u>Researcher</u> 6-min graphics
USA 6-101-013-XXX	<u>Researcher</u> 1-s graphics (55 reels)
USA 6-102-007-002	<u>Advance II</u> 6-min graphics
USA 6-102-013-XXX	<u>Advance II</u> 1-s graphics (52 reels)
USA 3-118-002-016	<u>IFYGL Bulletin</u> 16
USA 3-118-002-017	<u>IFYGL Bulletin</u> 17
USA 3-118-003-006	Rawinsonde data acquisition system
USA 3-118-003-007	Operational characteristics of DECCA

## Status of the Archive

Tables 5 and 6 show the availability of IFYGL data and carry the following information:

TASK NO. - The task numbers used for project identification.

INVESTIGATOR - Principal Investigator's name. The line numbers contained in the column identify groups of data. Line numbers not shown here relate to data collected but not placed in the final IFYGL Archive.

DESCRIPTION OF DATA - The underlined words are abbreviated task titles. The data or reports are described briefly.

MEDIA - These are not the media in which the data were received from the investigator, but are the media in which the data will be archived. In the United States final Archive, data will be preserved and distributed in the forms of magnetic tapes (digitized data), microfiche (reports), and microfilm (data that will not fit the other two media). Punched cards and papers will be converted to one of the preceding media for permanent retention, but will be retained for convenience until their usefulness has passed.

DATA AVAILABLE FROM INVESTIGATOR - Data on hand are identified ("At NCC") and estimated dates are given for the remaining data. "Now" means that the data are on hand at the Principal Investigator's location.

ARCHIVE - This tells the disposition of the data as follows:

Y - Yes - The data will be archived permanently.

YC - Yes - Copy to Canadian Data Bank. The data will be archived permanently and Canada has requested a copy for filing.

T - Temporary Archive. Data will be held until their usefulness is believed over.

PI - Principal Investigator. Data will be kept by the Principal Investigator, who should be contacted if the data are needed.

Requests for data should be directed to:

IFYGL Data Manager, Room 17  
National Climatic Center, EDS, NOAA  
Federal Building  
Asheville, NC 28801

Telephone: 704 258-2850, ext. 754; FTS 672-0754



Table 5.--Summary of data available from final  
IFYGL Archive: United States

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
PANEL: <u>ATMOSPHERIC BOUNDARY LAYER</u>					
3	Bean	RFF/DC-6 (Gust Probe)			
		3. Reduced turbulence data - Binary	Mag Tape	At NCC	Y
		4. Computed flux, Time series spectra	Microfilm	At NCC	YC
		5. Time series graphics(U,V,W,T,PV)	Microfilm	At NCC	YC
		6. Means, Variances and Fluxes	Microfilm	At NCC	YC
		7. Plots of Flight Paths	Microfiche	At NCC	YC
		8. Spatial-Temporal Variations in Turbulence Fluxes	Microfiche	At NCC	YC
5	Businger	Profile Mast and Tower			
		5. Computed profile & Flux data, 15 minute and hourly averages	Mag Tape	At NCC	YC
		6. Report-Profile Measurements in the Atmospheric Surface Layer	Microfiche	At NCC	YC
		7. Eddy Correlation Fluxes	Mag Tape	June 1976	Y
14	Estoque	Boundary Layer Structure			
		1. Land Met. Stations - Surface Met. Data	Strip Chart	Now	PI
		3. Tethered balloon (BLIP)	Microfilm	At NCC	YC
		6. NCAR Queen Air ACFT - Processed data listing - 1 sec. sample rate	Microfilm	Now	PI
		7. PIBAL observations-wind components	Microfilm	At NCC	YC
		8. Cloud Cover Photography - Time lapse	16MM Film	Now	PI
		9. Cloud Cover Photography - Still	Negatives	Now	PI
15	Estoque	Mesoscale Simulation Studies			
		1. Annual Report - Content of Mesoscale Disturbances by Synoptic Conditions	Microfiche	At NCC	YC
		2. Final Reports (3)	Microfiche	June 1976	YC
20	Almazan	Boundary Layer Flux Synthesis			
		1. Final Report	Microfiche	June 1976	YC
38	Panofsky	Turbulence-Niagara Bar Tower			
		3. Reduced wind speed fluctuations	Mag Tape	Now	PI
		5. Two-Point Statistics over Lake Ontario	Microfiche	At NCC	YC
63	Telford	NCAR/DRI Aircraft			
		2. Reduced data - Gust probe, met sensors	Mag Tape	Now	PI
		3. Reduced data - (Time, location, U, V, W, temperature, dew point, pressure)	Mag Tape	Now	PI
		4. Reduced data, Calcomp Plot - Aircraft Track 6-sec. wind vectors	Sheets	Now	PI
		5. Final data report-Computed fluxes of momentum, heat, vapor (1/minute)	Microfiche	Oct 1975	YC
		6. Final Report	Microfiche	June 1976	YC
PANEL: <u>BIOLOGY - CHEMISTRY</u>					
1	Armstrong	Sediment Analysis			
		2. Phosphorus Uptake-Release by Sediments	Microfiche	At NCC	YC
4	Burris	Nitrogen Fixation			
		2. Final Report	Microfiche	At NCC	YC
6	Kutkuhn	Status of Fish Population			
		1. Fish samples-Size,Numbers,Scale collections (From punched cards)	Mag Tape	At NCC	YC
		2. Fish samples-Size,Numbers,Scale collections (From punched cards)	Listing	At NCC	T
		3. Water temperature (BT) (From punched cards)	Mag Tape	At NCC	YC
		4. Digitized BT, 5 Fathoms	Listing	At NCC	T

March 16, 1976



Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>BIOLOGY - CHEMISTRY (Cont'd)</u>			
6	(Cont'd)	5. RESEARCHER Fathometer (Echo Sounding) 6. Final Report	Rolls Microfiche	Now Dec 1975	PI YC
7	Casey	<u>Material Balance</u> 1. Material balance data in STORET 3. Final Report - Streams 4. Final Report - Main Lake	STORET Microfiche Microfiche	At NCC April 1976 July 1976	Y YC YC
12	Thomas	<u>Rochester Embayment Study</u> 2. Chemical Data 4. Current speed and direction, water temperature, wind 10. Gravity Magnetic Survey 11. Researcher Fathometer Soundings 12. Final Report	Mag Tape Mag Tape Mag Tape Strip Ch. Microfiche	Now At NCC At CEDDA Now At NCC	PI YC PI PI YC
19	Hetting	<u>Transport of Nutrients and Pollutants</u> 1. Transport data in STORET 3. Final Report (Genesee River Basin)	STORET Microfiche	At NCC April 1976	Y YC
21	Lee	<u>Hazardous Material Flow</u> 1. Final Report	Microfiche	Dec 1975	YC
22	Kim	<u>Remote Measurement of Chlorophyll</u> 1. Report - New Algae Mapping Technique	Microfiche	At NCC	YC
26	Lee	<u>Algal Nutrient Availability</u> 3. Final Report	Microfiche	March 1976	YC
29	McNaught	<u>Zooplankton Production</u> 1. Zooplankton data in STORET 4. Acoustical Profiles 5. Zooplankton Concentration Samples 6. Final Report	STORET Sheets Samples Microfiche	At NCC Now Now Oct 1975	Y PI PI YC
33	Moore	<u>Nearshore Study</u> 1. Nearshore data in STORET 5. Final Report	STORET Microfiche	At NCC April 1976	Y YC
35	Mozley	<u>Benthos Study</u> 1. Benthos study data in STORET 3. EBT's-ADVANCE II, Cruise 26 4. Final Report	STORET Microfiche Microfiche	At NCC At NCC Feb 1976	Y YC YC
44	Bell	<u>Oswego Harbor Studies (SHENEHON)</u> 2. Final Meteorological 6-minute, Hourly and Daily data 3. Solar Radiation Incident & Reflected and Daily data 5. Chemical/digitized BT (1 meter) 6. Final Report (Oswego Harbor)	Mag Tape Charts Mag Tape Microfiche	Dec 1975 Now Sept 1975 Sept 1975	YC PI YC YC
46	Polcyn	<u>Cladophora Sensing</u> 1. Cladophora Distribution	Microfiche	At NCC	YC
47	Polcyn	<u>Suspended Sediments Sensing</u> No special report for this task. See Final Report for Task 45, Remote Sensing - Terrain -			

Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>BIOLOGY - CHEMISTRY (Cont'd)</u>			
60	Stoermer	<u>Phytoplankton Composition and Abundance</u>	STORET	At NCC	Y
	1.	Phytoplankton data	Microfiche	At NCC	YC
	3.	Data count Pre-report	Microfiche	At NCC	YC
	4.	Data Analysis-Lakewide Changes	Microfiche	At NCC	YC
	5.	Phytoplankton Composition & Abundance	Microfiche	At NCC	YC
62	Sweeney	<u>River Discharge Bio-Chemical Impacts</u>	STORET	At NCC	Y
	1.	Nearshore Bio-Chem STORET data	Microfiche	Feb 1976	YC
	6.	Final Report			
64	Thomann	<u>Eutrophication Model</u>			
	1.	Final Report	Microfiche	June 1976	YC
66	Thomas	<u>Sediment Oxygen Demand</u>			
	1.	Sediment oxygen data in STORET	STORET	At NCC	Y
	4.	Final Report	Microfiche	Feb 1976	YC
67	Thomas	<u>Lake Macrobenthos</u>			
	1.	Distribution of Benthic Organisms	Microfiche	Feb 1976	YC
	2.	Sediment Particle Size, Composition	Microfiche	Feb 1976	YC
	3.	Final Report	Microfiche	Feb 1976	YC
68	Lee	<u>Hazardous Chemicals</u>			
	1.	Hazardous chemical STORET data	STORET	At NCC	Y
	5.	Final Report-Chlorinated Hydrocarbons	Microfiche	At NCC	YC
71	Heberger	<u>Fish Forage Organisms</u>			
	1.	Fish Food Habits Data	Pun'd Cards	At NCC	YC
	2.	Final Report	Microfiche	Nov 1975	YC
73	Pinsak	<u>Lake Water Characteristics</u>			
	1.	Edited Depth, Temperature, Chemical composition data	Mag Tape	At NCC	YC
76	Robertson	<u>Fauna List</u>			
	1.	Final Report	Microfiche	June 1976	YC
78	Robertson	<u>Carbon Cycle Model</u>			
	1.	Final Report - Carbon Cycle Model	Microfiche	June 1976	YC
	2.	Final Report - Carbon Budget	Microfiche	June 1976	YC
		PANEL: <u>ENERGY BALANCE</u>			
2	Atwater	<u>Net Radiation</u>			
	1.	Interim Reports	Microfiche	At NCC	YC
	2.	Net radiation data for grid	Mag Tape	At NCC	Y
	3.	Final Report	Microfiche	At NCC	YC
17	Dilley	<u>Nearshore Ice Formation</u>			
	2.	Meteorological data-Van (Temperature, Wind, Radiation, Pressure)	Mag Tape	At NCC	YC
	3.	Time lapse photography (Ice Formation)	Film	Now	PI
	4.	Analysis of Lake Shore Ice Formation, Growth, and Decay-IFYGL Phase 2	Microfiche	At NCC	YC
	5.	Data Report	Microfiche	At NCC	YC
18	Grumblatt	<u>Advection Term-Energy Balance</u>			
	2.	Water temperature, 5-minute intervals	Mag Tape	At NCC	YC
	3.	Final Report	Microfiche	Jan 1976	YC
28	Lyons	<u>Cloud Climatology</u>			
	1.	Solar Radiation-Incident	Strip Ch.	Now	PI

Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

United States IFYGL Data to be placed in the Final Archive, stored in the  
Temporary Archive or retained by the Principal Investigator (Continued)

ASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>ENERGY BALANCE (Cont'd)</u>			
28	(Cont'd)	2. 1 Hour averages (Planimetered)	Microfiche	Oct 1975	YC
		3. Cloud photography-Color Panorama	35 MM Film	Now	PI
		4. Cloud photography-Color All Sky	16 MM Film	Now	PI
		5. Cloud photography-Other	35 MM Film	Now	PI
		7. Final Report	Microfiche	Oct 1975	YC
40	Piech	<u>Lake Optical Properties</u>			
		3. Turbidity Measurements-Irradiance Meter/Transmissometer-graphs	Sheets	Now	PI
		4. Turbidity Measurements - Irradiance meter/transmissometer - graphs	Microfiche	Oct 1975	YC
		5. Documentation-Location of measurements Final Report	Microfiche	Oct 1975	YC
41	Pinsak	<u>Lake Heat Storage</u>			
		1. Weekly mean water temperatures for lake cells	Microfiche	June 1976	YC
		2. Final Report	Microfiche	June 1976	YC
42	Pinsak	<u>Sensible &amp; Latent Heat Flux</u>			
		1. Final Report	Microfiche	June 1976	YC
43	Pinsak	<u>Lake Thermal Advection</u>			
		1. Final Report	Microfiche	June 1976	YC
54	Quinn	<u>Ice Studies for Storage Term</u>			
		1. Ice Thickness - Manual Measurement A. 5 sites, weekly B. Ice patterns-graphic display C. Surface meteorological data D. Albedo measurement	Microfiche	At NCC	YC
61	Strong	<u>Clouds, Ice, and Surface Temp.-Satellite</u>			
		1. NOAA 2 VHRR Digital Tapes	Mag Tape	Sept 1975	Y
		2. NOAA 2 VHRR Images	Film	Now	PI
		3. Final Report-Utilizing NOAA Sat. Data	Microfiche	At NCC	YC
		PANEL: <u>LAKE METEOROLOGY</u>			
36	Hoffeditz	<u>Evaporation Pan Network (US &amp; CDN)</u>			
		1. Radiation, Incident LW & SW hourly totals	Pun'd Cards	Oct 1975	YC
		2. Evaporation Pan data (US & CDN)	Pun'd Cards	Oct 1975	YC
		4. 4 Reports & Final Report	Microfiche	Oct 1975	YC
50	Rasmusson	<u>Atmospheric Water Balance</u>			
		1. Heat and Water Budget Computations	Microfiche	June 1976	YC
		2. Final Report	Microfiche	June 1976	YC
		PANEL: <u>TERRESTRIAL WATER BALANCE</u>			
8	Schutze	<u>Runoff</u>			
		1. Weekly streamflow data	Microfiche	June 1976	YC
		2. Summary Report	Microfiche	June 1976	YC
9	Schutze	<u>Evaporation (Lake-Land)</u>			
		1. Weekly evaporation estimates	Microfiche	June 1976	YC
		2. Final Report	Microfiche	June 1976	YC
10	DeCooke	<u>Simulation Studies</u>			
		1. Final Report	Microfiche	June 1976	YC



Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>TERRESTRIAL WATER BALANCE (Cont'd)</u>			
11	Weiser	Lake Precipitation	Microfiche	June 1976	YC
		1. Monthly precip estimates-US Basin	Microfiche	June 1976	YC
		2. Final Report			
13	Embree	Soil Moisture and Snow Hydrology			
		2. Soil moisture tabulated data (1/Month)	Microfiche	Sept 1975	YC
		3. Snow Depth-Water equivalent (1/Month)	Microfiche	Sept 1975	YC
		4. Stream flow - discharge	Microfiche	Sept 1975	YC
		5. Final Report	Microfiche	Sept 1975	YC
16	Stoughton	Lake Level Transfer			
		1. Final Report	Microfiche	Dec 1975	YC
23	Cox	Outflow Term TWB			
		1. Discharge St. Lawrence River	Mag Tape	At NCC	YC
		2. Final Report	Microfiche	At NCC	YC
24	Cox	Flow Model			
		1. Final Report	Microfiche	Dec 1976	YC
30	Wilshaw	Lake Storage Term (Water Levels)			
		2. 5-minute water levels	Mag Tape	At NCC	YC
		3. Raw hourly water levels	Mag Tape	Nov 1975	T
		4. Edited (Converted to common datum)hourly water levels	Mag Tape	At NCC	YC
		5. Final Report	Microfiche	Nov 1975	YC
31	Schutze	Soil Moisture			
		1. Weekly soil moisture data	Microfiche	June 1976	YC
		2. Final Report	Microfiche	June 1976	YC
39	Peck	Airborne Snow Reconnaissance			
		2. Ground Truth Data	Microfiche	At NCC	YC
		3. Airborne Survey Water Equivalent	Microfiche	At NCC	YC
		4. Soil moisture measurements	Microfiche	At NCC	YC
		5. Snow cover water equivalents	Microfiche	At NCC	YC
		6. Water equivalent - air survey	Microfiche	At NCC	YC
		7. Final Report (Task Summary)	Microfiche	Dec 1975	YC
45	Polcyn	Remote Sensing - Terrain			
		2. Aerial photography-Color	70 MM Film	Now	PI
		3. Aerial photography-Black-White Prints	Film	Now	PI
		4. Aerial photography-White Negatives	Film	Now	PI
		6. Final Report	Microfiche	At NCC	YC
		7. Aircraft flight data record	Microfiche	At NCC	YC
48	Quinn	Island - Land Precipitation			
		2. Hourly precipitation amounts	Mag Tape	At NCC	YC
		3. Precipitation - 80 NWS stations	Mag Tape	At NCC	YC
		4. Daily Lake Ontario Basin precipitation	Microfiche	At NCC	YC
		5. Over Lake Precipitation Report	Microfiche	June 1976	YC
		6. Over Land Precipitation Report	Microfiche	At NCC	YC
51	Quinn	Evaporation Synthesis			
		1. Final Report	Microfiche	June 1977	YC
52	Rhodehamel	Groundwater Wells			
		2. Water levels analog-continuous	Strip Ch.	Now	PI
		3. Summary (chronological list)	Microfiche	Oct 1975	YC
		4. Final Report	Microfiche	June 1976	YC



Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

ASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
58	Schultz	PANEL: <u>TERRESTRIAL WATER BALANCE (Cont'd)</u> <u>Runoff</u> 1. Tributary stage levels - strip charts (4 USGS gages) 2. Tributary stage levels observations 15 minute-digital USGS gages 3. Tributary stage levels - daily data 4. Tributary stage levels 5. Mean weekly flow 6. Tributary stage & discharge, 35 miscellaneous sites-intermittent 7. N.Y. State Barge Canal data 8. Final Report	Microfilm Mag Tape Mag Tape Pun'd Cards Microfiche Microfiche Microfiche Microfiche	At NCC Oct 1975 Now At NCC At NCC At NCC At NCC At NCC	YC YC PI T YC YC YC YC
69	Wilson	<u>Radar and Precipitation Gage Network</u> 1. Raw radar data-returned echo intensity-compacted 3. Photographs of radar scope 4. Daily total precipitation amounts including precipitation gage data 5. Radar Documentation 6. Oswego Radar Event Logs 7. Raw precipitation data-Rochester precipitation network 8. Documentation-Rochester Precip. network observers logs 10. Precipitation data - Rochester Network 11. Precipitation data - Oswego Snow Network 12. Radar data hourly precipitation amounts (by storm) 13. Avg. daily precip., eastern Lake Ontario 14. Collection and Analyses of Digitized Radar Data - Report 15. Final Report	Mag Tape Microfilm Mag Tape 150 Pages 300 Pages Paper Tape 600 Pages Mag Tape Microfiche Mag Tape Microfiche Microfiche Microfiche	Now At NCC At NCC At NCC At NCC At NCC At NCC At NCC At NCC May 1976 At NCC At NCC At NCC	PI Y YC T T T T YC YC YC YC YC YC
70	Wiesnet	<u>Aerial Hydrological Survey</u> 7. Final Report	Microfiche	At NCC	YC
74	Sykes	<u>Snow Observation Network</u> 2. Rain Gage Charts - 13 locations 3. Student observation forms 4. Replications of Ice Crystals 5. Photo of flakes, crystal types 6. Final Report I. Oswego Weather Radar Project 1972/1973 7. Final Report II. Precipitation Gages plus Snowfall 8. Final Report III. Supp. Study 1973/1974	Microfilm 5000 Pages Slides Film Microfiche Microfiche Microfiche	At NCC Now Now Now At NCC At NCC At NCC	Y PI PI PI YC YC YC
27	Liu	PANEL: <u>WATER MOVEMENT</u> <u>Waverider Buoy</u> 3. Digitized wave data(3 samples/second) 5. Hourly summary and plot of digitized wave data 6. Final Report	Mag Tape Microfilm Microfiche	At NCC At NCC At NCC	Y YC YC
34	Mortimer	<u>Internal Waves - Temperature Transect</u> 5. Temperature Transects 6. Final Report	Microfilm Microfiche	Oct 1975 Oct 1975	YC YC

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Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>WATER MOVEMENT (Cont'd)</u>			
37	Pandolfo	Simulation Studies			
	1.	Volume I - Final Report	Microfiche	At NCC	YC
	2.	Volume II - FORTRAN Program	Microfiche	At NCC	YC
	3.	Volume III - One-Dimensional Model	Microfiche	At NCC	YC
	4.	Volume IV - 3-Dimensional Model	Microfiche	At NCC	YC
49	Rao	<u>Lake Circulation</u>			
	1.	Final Report	Microfiche	June 1976	YC
55	Saylor	<u>Lagrangian Current Observations</u>			
	1.	Current drogue - Daily plot	Microfilm	July 1976	YC
	2.	Water temperature - Daily chart	Microfiche	July 1976	YC
	5.	Final Report	Microfiche	July 1976	YC
56	Saylor	<u>Circulation - Currents</u>			
	2.	Current/Wind daily charts	Microfilm	Now	PI
	3.	Final Report	Microfiche	July 1976	YC
59	Scott	<u>Coastal Chain</u>			
	1.	Current Meter Data, Water Temperature	Mag Tape	At NCC	YC
	2.	Final and Basic Data Report	Microfiche	At NCC	YC
72	Csanady	<u>Coastal Circulations</u>			
	1.	Final Report	Microfiche	June 1976	YC
77	Pickett	<u>Physical Lake Properties</u>			
	1.	Current, temperature analysis	Microfiche	Dec 1976	YC
	2.	Final Report	Microfiche	Dec 1976	YC
		PANEL: <u>MAJOR SYSTEMS</u>			
100	CEDDA	<u>Physical Data Collection System</u>			
	1.	Basic data-engineering counts	Mag Tape	At NCC	T
	2.	Provisional Meteorological and Limnological data (6 Minute)	Mag Tape	At NCC	YC
	3.	-Data Listing	Microfilm	At NCC	YC
	4.	-Time Series Graphics	Microfilm	At NCC	YC
	5.	Final Meteorological & Limnological Data ( 6 Minute)	Mag Tape	At NCC	YC
	6.	Data Listing of 6 Minute Observations and Hourly Averages	Microfilm	At NCC	YC
	7.	-Time Series Graphics ( 6 Minute)	Microfilm	At NCC	YC
	8.	-Hourly Average tapes	Mag Tape	At NCC	YC
	9.	Station event logs and histories	Microfilm	At NCC	Y
	10.	System documentation	Microfiche	Dec 1975	YC
	11.	Calibration data	Microfilm	At NCC	Y
	13.	Manual edited data	Mag Tape	At NCC	T
	14.	Sensor Calibrations	Mag Tape	At NCC	T
	15.	Translated cassette data	Mag Tape	At NCC	T
	16.	Rochester Control Center back up tapes	Mag Tape	At NCC	T
	17.	Pre-provisional time series plots	Microfilm	At NCC	T
	18.	Met. Data-Canadian and U.S. Buoys	Mag Tape	At NCC	Y
	19.	Precipitation sensor evaluation	Microfiche	At NCC	YC
	20.	Misc. PDCS Logs and Folders	Paper	At NCC	T
101	CEDDA	<u>US IFYGL Ship System-RESEARCHER</u>			
	3.	1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
	4.	EBT On-station data, 6-minute total radiation, Decibar average Subsurface data, 6-minute average data	Mag Tape	At NCC	YC

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Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

SK D	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>MAJOR SYSTEMS (Cont'd)</u>			
01	(Cont'd)	5. DAS Documentation, Calibration, Bridge event logs	Pages	At NCC	T
		6. DAS Documentation, Logs, and Traces	Microfilm	At NCC	T
		7. Radiation data and 6 minute averages - -Time Series Graphics	Microfilm	At NCC	YC
		8. Manual observations - Raw	Pages	At NCC	T
		9. Manual observations - Edited	Mag Tape	At NCC	YC
		10. Quality Control Strip Charts	Strip Ch.	Now	T
		11. 9-Point digitized EBT	Mag Tape	At NCC	Y
		12. EBT X,Y traces	Microfilm	At NCC	Y
		13. Time Series Graphics, 1-second data	Microfilm	At NCC	Y
		14. EBT Graphics	Microfilm	At NCC	Y
		15. 1-Second Data Listing	Microfilm	At NCC	T
		16. RESEARCHER Dissolved oxygen traces	Microfilm	At NCC	Y
		17. Barograph charts	Microfiche	At NCC	YC
		18. Processing documentation	Microfiche	Dec 1975	YC
		19. XBT data	Microfilm	At NCC	Y
		20. XBT data - digitized at NODC	Mag Tape	At NCC	YC
		21. System manuals	Pages	At NCC	T
		22. Navigation plots and graphics	Charts	At NCC	T
		23. DAS Tapes	Mag Tape	At NCC	T
02	CEDDA	<u>US IFYGL Ship System-ADVANCE II</u>			
		3. 1 Second data - (1/10 Second, Subsurface)	Mag Tape	At NCC	Y
		4. EBT On-station data, 6 minute total radiation, Decibar average Subsurface) data, 6-minute average data	Mag Tape	At NCC	YC
		5. DAS Documentation, Calibration, Bridge event logs	Microfilm	At NCC	T
		6. DAS Documentation, Logs, and Traces	Microfilm	At NCC	T
		7. Radiation data and 6 minute averages - -Time Series Graphics	Microfilm	At NCC	YC
		8. Manual observations - Raw	Pages	At NCC	T
		9. Manual observations - Edited	Mag Tape	At NCC	YC
		10. Quality Control Strip Charts	Strip Ch.	Now	T
		11. 9-Point digitized EBT	Mag Tape	At NCC	Y
		12. EBT X,Y traces	Microfilm	At NCC	Y
		13. Time Series Graphics, 1-second data	Microfilm	At NCC	Y
		14. EBT Graphics	Microfilm	At NCC	Y
		15. 1 sec. data listing	Microfilm	At NCC	T
		16. Processing documentation	Microfiche	Dec 1975	YC
		17. Navigation plots	Charts	At NCC	T
03	CEDDA	<u>Rawinsonde</u>			
		2. Raw rawinsonde data copy of data tapes	Mag Tape	At NCC	T
		3. Raw data-Met. parameters	Strip Ch.	At CEDDA	T
		4. Raw Data Time Series Plots	Microfilm	At NCC	Y
		5. Final data - 5 Second Averages	Mag Tape	At NCC	Y
		6. Final data - 10 Millibar Increments	Mag Tape	At NCC	YC
		7. Final data - 50 Millibar Increments	Mag Tape	At NCC	YC
		8. Adiabatic charts and listings	Microfilm	At NCC	YC
		10. Processing document	Microfiche	Dec 1975	YC
		11. Down Track Trace	Mag Tape	Now	PI
		13. Documentation and basic information	Microfilm	At NCC	Y
		15. Unedited, unpacked, raw data	Mag Tape	At NCC	T
0	EPA	<u>STORET Data</u>			
		1. Jan. 1975 Readout-Fiche	Microfiche	At NCC	TC
		2. Jan. 1975 Readout-Film	Microfilm	At NCC	TC
		3. Final data - Microfiche	Microfiche	At NCC	YC
		4. Jan. 1975 Readout-Tape	Mag Tape	At NCC	T
		5. Final data - Tape	Mag Tape	At NCC	Y
		6. Final data - Inventories	Pages	At NCC	T



Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
118	IFYGL	PANEL: <u>MAJOR SYSTEMS (Cont'd)</u>  <u>Miscellaneous IFYGL Reports</u> 1. Technical Plan 2. Bulletin 3. Technical Manual Series 4. Scientific Series 5. Two Nations, One Lake 6. Proceedings, IFYGL Symposium, AGU 7. First Annual Report, EPA	Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC . At NCC At NCC At NCC	YC YC YC YC YC YC YC
119	Robertson	<u>IFYGL Intercomparisons</u> 1. Intercomparison Data & Methods 2. Final Report	Microfiche Microfiche	Dec 1975 Dec 1975	YC YC
200	NCC/NOAA	PANEL: <u>SUPPLEMENTARY DATA</u>  <u>Hourly Surface Aviation</u> 1. Surface Weather Observations-Forms 2. Surface Weather Observations-Digitized 3. Surface Weather Observations-Film	Paper Mag Tape Microfiche	Now Now Now	PI PI PI
205	NCC/NOAA	<u>Synoptic Observations</u> 1. Original 3 & 6-Hrly. Synoptic Obs. 2. Original 3 & 6-Hrly. Synoptic Obs., Film	Paper Microfilm	Now Now	PI PI
210	NCC/NOAA	<u>Daily Co-op Observations</u> 1. Record of Climatological Obs. 2. Record of Climatological Obs., Digitized	Paper Mag Tape	Now Now	PI PI
215	NCC/NOAA	<u>Climatic Summaries</u> 1. Local Climatological Data 2. Prel. Local Climatological Data 3. Climatological Data 4. Summary of the Day Listing	Paper Paper Paper Paper	Now Now Now Now	PI PI PI PI
220	NCC/NOAA	<u>Ships of Opportunity</u> 1. Great Lakes Vessel Reporting Form 2. Great Lakes Vessel Reporting Form-Digitized	Paper Mag Tape	Now Now	PI PI
225	NCC/NOAA	<u>RADAR Observations</u> 1. RADAR Log 2. RADAR Film (Also see Task 69TW)	Paper Microfilm	Now Now	PI PI
230	NCC/NOAA	<u>Station History/Instrumentation</u> 1. NWS Station Description Forms	Paper	Now	PI
235	NCC/NOAA	<u>Solar Radiation</u> 1. Hourly/Daily Digitized Data 2. Hourly/Daily Forms 3. Hourly/Daily Instrument Charts	Mag Tape Paper Charts	Now Now Now	PI PI PI
240	NCC/NOAA	<u>Recorder Charts</u> 1. Gust Recorder 2. Triple Register 3. Barograms 4. Rain Gage 5. Rain Gage	Paper Paper Paper Paper Mag Tape	Now Now Now Now Now	PI PI PI PI PI
245	NCC/NOAA	<u>Analyzed Maps/Charts</u> 1. NMC Charts 2. NMC Charts	Microfilm Paper	Now Now	PI PI



Table 5.--Summary of data available from final IFYGL  
Archive: United States (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>SUPPLEMENTARY DATA (Cont'd)</u>			
261	NCC/NOAA	<u>Lake Data</u>			
		1. Monthly Bulletin of Lake Levels	Report	Now	PI
		2. Great Lakes Water Levels	Report	Now	PI
280	NCC/NOAA	<u>Other</u>			
		1. Aerial Photographs of Rochester	Prints	Now	PI

Table 6.--Summary of data available from  
final IFYGL Archive: Canada

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
		<u>PANEL: ATMOSPHERIC BOUNDARY LAYER</u>			
5	Donelan	<u>Direct Measurement of Energy Fluxes</u> 1. Niagara Bar Micromet Data-10 min. 2. 30-Min Ave. radiation & water level 3. Determination of Aerodynamic Drag Coefficient	Mag Tape Microfilm Microfiche	At NCC At NCC Dec 1975	Y Y Y
15	McBean	<u>Space Spectra in the Free Atmosphere</u> 1. Mesoscale low-level flight data 2. Mesoscale low-level flight data	Mag Tape Microfiche	At NCC At NCC	Y Y
28	McBean	<u>Momentum, Heat, &amp; Moisture Transfer</u> 1. Niagara Bar Micromet data	Microfiche	At NCC	Y
44	Elder	<u>Analysis of Energy Fluxes</u> 2. Preliminary estimates 3. Preliminary Energy Budget 4. Preliminary investigation of wind stress field over Lake Ontario	Microfiche Microfiche Microfiche	At NCC At NCC At NCC	Y Y Y
75	Smith	<u>Wind &amp; Temperature Fluctuations</u> 1. Niagara Bar preliminary data 2. Niagara Bar final data 3. Report-Eddy Flux Measurements	Microfiche Microfiche Microfiche	At NCC At NCC At NCC	Y Y Y
97	Elder	<u>Meteorological Buoy Measurements</u> 1. 10-min observational data & 1 hour averaged data 2. Prelim Invest-Wind Stress Field 3. Field Report 4. Summary of Met. Buoy & Manual Measurements 5. A Met. Buoy System for Great Lakes Studies 6. Listings	Mag Tape Microfiche Microfiche Microfiche Microfiche Microfilm	At NCC At NCC At NCC At NCC At NCC At NCC	Y Y Y Y Y Y
107	Whelpdale	<u>Air Pollution Sinks</u> 1. Sulphate deposition by precipitation	Microfiche	At NCC	Y
		<u>PANEL: BIOLOGY - CHEMISTRY</u>			
54	Gorman	<u>Groundwater Supply Near Kingston</u> 1. Geochemical Study of Deadman Bay	Microfiche	At NCC	Y
81	Salbach	<u>Material Balance Lake Ontario</u> 1. Water quality info - preliminary 2. Water quality data - tributary streams	Microfiche Microfiche	At NCC At NCC	Y Y
82	Roff	<u>Lake Ontario Zooplankton Migration</u> 1. Energetics of Vert. Migration	Microfiche	At NCC	Y
83	Christie	<u>Cooperative Studies of Fish Stocks</u> 1. Times, locations of trawl drags 2. Effects on the Salmonid Community 3. Changes in Fish Species Composition	Microfiche Microfiche Microfiche	At NCC At NCC At NCC	Y Y Y
84	Owen	<u>Cladophora Growth</u> 1. Location and Extent of Cladophora	Microfiche	Dec 1975	Y
85	Fraser	<u>Nutrient Cycles, Lake Ontario</u> 1. Phosphorus & Nitrogen Transects	Microfiche	At NCC	Y

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Table 6.--Summary of data available from final  
IFYGL Archive: Canada (Continued)

SK O	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>BIOLOGY - CHEMISTRY (Cont'd)</u>			
6	Nicholson	1. <u>Lake Ontario Surface Plankton Survey</u> Pigment Analysis: Chlorophyll "A"	Microfiche	At NCC	Y
8	Munawar	2. <u>Lake Ontario Cross-Section Study</u> Abundance of Diatoms, SW Nearshore	Microfiche	At NCC	Y
1	Munawar	<u>Lake Ontario Primary Production Study</u>			
		1. Measurement and Prediction	Microfiche	At NCC	Y
		2. Primary production at an Inshore & Offshore Station	Microfiche	At NCC	Y
		3. Final Report-Biomass Parameters and Primary Production	Microfiche	Aug 1975	Y
2	Glooschenko	1. <u>Lake Ontario Diel Pigment Variation</u> Diel Chlorophyll "A" Variations	Microfiche	At NCC	Y
3	Gilbertson	1. <u>Pesticide Concentration in Birds' Eggs</u> Seasonal Changes, Terns, Hamilton	Microfiche	At NCC	Y
4	Shioml	1. <u>Rain Quality Monitoring</u> Composition of Precipitation	Microfiche	Dec 1975	Y
		PANEL: <u>ENERGY BALANCE</u>			
8	Robertson	<u>Shore Gauging Stations</u>			
		1. Hourly averaged water temperature	Mag Tape	At NCC	Y
		2. Key Punch Card Documentation	Microfiche	At NCC	Y
		3. Documentation of System	Microfiche	Dec 1975	Y
2	Rodgers	1. <u>Thermal Bar Study</u> Energy Budget Study	Microfiche	At NCC	Y
2	Boyce	<u>Heat Storage of Lake Ontario</u>			
		1. Heat Content Survey Report #1	Microfiche	At NCC	Y
		2. Heat Content Survey Report #2	Microfiche	At NCC	Y
		3. Heat Content Survey Report #3	Microfiche	At NCC	Y
		4. Heat Content Survey Report #4	Microfiche	At NCC	Y
		5. Heat Content Survey Report #5	Microfiche	At NCC	Y
		6. Heat Content Survey Report #6	Microfiche	At NCC	Y
		7. Heat Content Survey Report #7	Microfiche	At NCC	Y
		8. Heat Content Survey Report #8	Microfiche	At NCC	Y
		9. Heat Content Survey Report #9	Microfiche	At NCC	Y
		10. Heat Content Survey Report #10	Microfiche	At NCC	Y
		11. Final Report	Microfiche	Jan 1976	Y
		12. River Flows and Temperature Inputs to Lake Ontario	Mag Tape	At NCC	Y
1	McCulloch	<u>Canadian Radiation Network</u>			
		1. AES radiation data-see Task 80			
		3. Instrument Location & Obstruction Charts	Microfiche	At NCC	Y
2	Ramseier	<u>Floating Ice Research</u>			
		1. Navigation Season Extension Studies	Microfiche	At NCC	Y
		2. Studies, Extension of Winter Nav.	Microfiche	At NCC	Y
3	Judge	<u>Terrestrial Heat Flow</u>			
		1. Analysis of Heat Data	Microfiche	At NCC	Y
		2. Mud Temperature Gradient	Microfiche	March 1976	Y
		3. Thermal Conductivity of Lake Ontario	Microfiche	March 1976	Y

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Table 6.--Summary of data available from final  
IFYGL Archive: Canada (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
80	Davies	PANEL: <u>ENERGY BALANCE (Cont'd)</u>  Radiation Balance Program 1. Radiation data 3. Final Report, Canadian Radiation	Mag Tape Microfiche	At NCC At NCC	Y Y
87	Boyce	<u>Heat Flow to Lake Ontario</u> Included in Task 42 EB			
1	Thomson	PANEL: <u>FIELD SUPPORT</u>  <u>Remote Sensing</u> 1. Lake Dynamics Utilizing Sun-Glint 2. High Altitude Remote Sensing 3. Optical Properties of the Great Lakes	Microfiche Microfiche Microfiche	At NCC At NCC At NCC	Y Y Y
30	Rodgers	<u>IFYGL Operations - CCGS PORTE DAUPHINE</u> 1. Digitized Shipboard Data - EBT A. Conductivity of Surface Water B. Chlorophyll samples C. Hourly weather data D. Radiation data 6. Shipboard data	Mag Tape     Microfilm	At NCC     At NCC	Y Y Y Y Y Y
68	Sly	<u>CCIW Supporting Resources</u> 1. Shipboard data - STAR Format 2. Description of STAR System 3. TSAR Format Documentation 4. Shipboard EBT data 5. Star Monitor Layout 6. Shipboard data	Mag Tape Microfiche Paper Mag Tape Paper Microfilm	At NCC  At NCC At NCC At NCC At NCC	Y Y T Y T Y
79	McCulloch	<u>Bathymetric Surveys - Lake Ontario</u> 1. Lake Ontario Bathymetric data	Mag Tape	At NCC	Y
94	MacPhail	<u>Data Retransmission by Satellites</u> 1. Data retransmission	Microfiche	At NCC	Y
118	Byron	<u>Publications</u> 1. Plan of Study for IFYGL 2. Objective Analysis Surface Pressure 3. Numerical Models of Airflow 4. 1971 Buoy Intercomparison 5. Canadian Projects & Supplements 1-4 6. Canadian IFYGL Data Submissions 7/31/74 7. Intercomparison - Research Aircraft 8. Hydrometeorological Studies 9. The IFYGL Field Year	Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC At NCC At NCC At NCC At NCC At NCC	Y Y Y Y Y Y Y Y Y
250	IFYGL	<u>Weather Summaries</u> 1. IFYGL "WEATHER DATA" Monthly	Microfiche	At NCC	Y
16	Irbe	PANEL: <u>LAKE METEOROLOGY &amp; EVAPORATION</u>  <u>Airborne Radiation Thermometer Surveys</u> 1. Airborne Radiation thermometer maps	Microfiche	At NCC	Y
18	McCulloch	<u>Climatological Network</u> 1. Monthly record Canadian Met. data 2. 1972 Ship data - all Lakes 4. Hourly Weather data	Report Mag Tape Mag Tape	At NCC At NCC At NCC	T Y Y



Table 6.--Summary of data available from final  
IFYGL Archive: Canada (Continued)

SK O	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>LAKE METEOROLOGY &amp; EVAPORATION (Cont'd)</u>			
20	McCulloch	1. <u>Bedford Tower Program</u> Bedford Tower Met. data	Mag Tape	July 1976	Y
21	McCulloch	1. <u>Canadian Shoreline Network</u> Met. data: Shoreline Stations	Mag Tape	At NCC	Y
22	Lalande	1. <u>Synoptic Studies</u> Synoptic Studies Analysis	Microfiche	Dec 1977	Y
23	Pollock	1. <u>Precipitation in Canada</u> Daily gridpoint values of prec. 2. Distrometer & rain gauge data	Mag Tape Mag Tape	At NCC At NCC	Y Y
24	Phillips	1. <u>Climatological Studies</u> IFYGL Weather Highlights 2. Surface Weather Maps	Microfiche Microfilm	At NCC At NCC	Y Y
25	Irbe	1. <u>Lake Ontario Evaporation by Mass Transfer</u> Monthly estimates	Microfiche	At NCC	Y
27	McCulloch	1. <u>Island Precipitation Network</u> Supplementary Precipitation data	Microfiche	At NCC	Y
64	Ferguson	1. <u>Basin Evapotranspiration</u> Monthly maps of Evapotranspiration	Microfiche	Dec 1975	Y
65	Phillips	1. <u>Evaporation Pan Network</u> Evaporation Pan Documentation	Microfiche	At NCC	Y
66	Ferguson	1. <u>Atmospheric Water Balance Study</u> Atmospheric Water Balance	Microfiche	At NCC	Y
67	Webb	1. <u>Surface Water Temperature Distribution</u> Mean Monthly Temperatures	Microfiche	At NCC	Y
77	McCulloch	1. <u>APT Photographs</u> ESSA 8 APT photographs	Microfilm	At NCC	Y
		PANEL: <u>TERRESTRIAL WATER BALANCE</u>			
11	Witherspoon	1. <u>Monthly Water Balance-Lake Ontario Basin</u> Hydrologic Model of the Basin 2. Storage in the Water Balance	Microfiche Microfiche	At NCC At NCC	Y Y
12	Witherspoon	7. <u>Monthly Water Balance of Lake Ontario</u> An Estimate of Water Balance 8. Preliminary Lake Ontario Water Balance 9. General Water Balance of Lake Ontario	Microfiche Microfiche Microfiche	At NCC At NCC At NCC	Y Y Y
13	Lennox	1. <u>Groundwater Flow Into Lake Ontario</u> Groundwater Flow Simcoe and Ontario 2. Groundwater Inflow Canadian Side	Microfiche Microfiche	At NCC At NCC	Y Y
14	MacDonald	1. <u>Hydrology of Lake Ontario</u> Tributary data 2. Daily discharge	Microfiche Mag Tape	At NCC At NCC	Y Y
38	Ostry	1. <u>Groundwater Contribution</u> Observation wells 2. Snow courses 3. Soil moisture Data	Microfiche Microfiche Microfilm	At NCC Sept 1975 At NCC	Y Y Y

March 17, 1976

Table 6.--Summary of data available from final  
IFYGL Archive: Canada (Continued)

TASK NO	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAILABLE FROM INVESTIGATOR	ARCHIVE
		PANEL: <u>TERRESTRIAL WATER BALANCE (Cont'd)</u>			
38	(Cont'd)	4. Overburden well yields	Microfiche	At NCC	Y
		5. Hydrology of Forty Mile Creek	Microfiche	At NCC	Y
		6. Bedrock well yields	Microfiche	At NCC	Y
		7. Groundwater chemistry-Forty Mile Creek	Microfiche	At NCC	Y
		8. Surficial geology, N. Shore-Newcastle	Microfiche	At NCC	Y
		9. Hydrogeology-Bowmanville, Newcastle	Microfiche	At NCC	Y
46	Quast	<u>St. Lawrence-Niagara Riv. Measuring Program</u>			
		1. Inflow measurements	Microfiche	At NCC	Y
49	Adams	<u>Snow Stratigraphy and Distribution</u>			
		1. Peterborough Area: Met. data	Microfiche	Dec 1975	Y
		7. Peterborough Area: Snow data	Microfiche	At NCC	Y
69	Henderson	<u>Pleistocene Mapping</u>			
		1. Maps and charts	Microfiche	June 1976	Y
74	Dohler	<u>Water Level Network</u>			
		1. Port Weller (Last of period not received yet)	Mag Tape	Part At NCC	Y
		2. Toronto	Mag Tape	Part At NCC	Y
		3. Burlington	Mag Tape	Part At NCC	Y
		4. Cobourg	Mag Tape	Part At NCC	Y
		5. Point Petre	Mag Tape	Part At NCC	Y
		6. Kingston	Mag Tape	Part At NCC	Y
		7. Format Hrly Header & Monthly Cards	Paper	At NCC	Y
		8. Water levels	Mag Tape	At NCC	Y
116	Loijens	<u>Airborne Gamma-Ray Snow Survey</u>			
		1. Snow-Water Equivalent	Microfiche	At NCC	Y
		2. Experimental Snow Survey	Microfiche	At NCC	Y
		3. Comparison of Water Equivalent	Microfiche	At NCC	Y
		PANEL: <u>WATER MOVEMENT</u>			
34	Rodgers	<u>Circulation Near Toronto</u>			
		1. Tower current speed & direction water temperature	Mag Tape	Availability uncertain	Y
40	Csanady	<u>Coastal Chain Study</u>			
		1. Provisional Reports	Microfiche	At NCC	Y
		2. Final Report	Microfiche	At NCC	Y
		4. Daily Summary - Presquile	Pun'd Cards	At NCC	T
		5. Daily Summary - Oshawa	Pun'd Cards	At NCC	T
		6. Daily Summary: Presquile & Oshawa	Mag Tape	At NCC	Y
		7. Baroclinic Coastal Jets	Microfiche	At NCC	Y
43	Boyce	<u>Internal Wave Measurements</u>			
		1. Transect cross section	Microfiche	Dec 1976	Y
		2. Fixed Temperature Profiler (FTP) data	Not Known	Dec 1976	Y
		3. Transect tape (See Task 68)			
		4. FTP data file (See Task 42)			
45	Bennett	<u>Lake Current Measurements</u>			
		2. 10 minute current temperature data	Mag Tape	At NCC	Y
		3. Final Report	Microfiche	Dec 1976	Y
		4. 10 minute current data listing	Microfilm	At NCC	Y
70	Falconer	<u>Ground Truth for Remote Sensing</u>			
		1. Analysis of ERTS and Aircraft data	Microfiche	Sept 1975	Y
		2. Flight Line Maps	Microfiche	At NCC	Y

Table 6.--Summary of data available from final  
IFYGL Archive: Canada (Continued)

ASK O	INVESTIGATOR	DESCRIPTION OF DATA	MEDIA	DATE AVAIL- ABLE FROM INVESTIGATOR	ARCHIVE
76	Holland	PANEL: <u>WATER MOVEMENT (Cont'd)</u>  <u>Surface Wave Studies</u> 1. Final Report - Wave Climate Study 2. Wave Climate Data - Cobourg 4. Wave Climate Data-Main Duck Island 5. Equiv. Wave Heights vs. Period, 3 Stns. 8. Wave Climate Data - Toronto 10. Format for Wave Climate Study	Microfiche Mag Tape Mag Tape Microfiche Mag Tape Microfiche	Unknown At NCC At NCC At NCC At NCC At NCC	Y Y Y Y Y Y
89	Murthy	<u>Turbulent Diffusion Studies</u> 1. Large Scale Diffusion Studies 2. Nearshore Diffusion Studies 3. Lagrangian and Current Measurements 4. Diffusion in Thermocline & Hypolimnion regions 5. Dispersion of Floatables 6. Observations of Lateral Shear	Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC At NCC At NCC	Y Y Y Y Y Y
95	Simons	<u>Hydrodynamical Modelling</u> 6. First Report: Model Study of Agnes 7. Model Study of Betty Storm 8. Development of Numerical Models 9. Development of Numerical Models Part 2 10. 3 Dimensional Models 11. Obs. & Computed Current-Hurricane Agnes 12. Hydrodynamical Modelling Studies 13. Verification of Numerical Models Part 1	Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche Microfiche	At NCC At NCC At NCC At NCC At NCC At NCC At NCC	Y Y Y Y Y Y Y
109	Rodgers	<u>Upwelling Study</u> 1. Water Temp. (EBT): Included in Task 30			
110	Arajs	<u>Hydro Intake Study</u> 1. Water current & temp.: Chub Point, Bowmanville, Weoleyville, Pickering and Lennox 2. Nearshore Currents and Temperatures Pickering-Cobourg	Mag Tape Microfiche	At NCC At NCC	Y Y
111	Palmer	<u>Lakeview Dispersion Study</u> 1. Current Meter Data - Lakeview 2. Current Meter Data - Lorne Park	Mag Tape Mag Tape	At NCC At NCC	Y Y
115	Cho	<u>Wave Climatology</u> <u>Manual Records at CCIW</u>			

March 17, 1976





















